PENTAX™

OWNER'S MANUAL

PENTAX VIDEO PROCESSOR

EPK-1000

INTENDED USE:

This electro-medical device (Video Processor) is intended to be used for endoscopic diagnosis and treatment.
Together, this Video Processor and PENTAX video endoscope may provide optical visualization of, and/or therapeutic access to, various body cavities, organs and canals. Do NOT use this device for any purpose other than that for which it has been designed.
This device should only be used by physicians who have thoroughly studied all the characteristics of this device and who are familiar with the proper techniques of endoscopy.

IMPORTANT

Read this manual before operating and save this book for future reference.

This manual describes the recommended procedures for inspecting and preparing the EPK-1000 Video Processor prior to its use and the care and maintenance after its use. It does not describe how an actual procedure is to be performed, nor does it attempt to teach the beginner the proper technique or any medical aspects regarding the use of the equipment. Failure to follow the instructions in this manual may result in damage to and/or malfunction of the equipment.
Do NOT use this device for any other purpose than that for which it has been designed.

If you have any questions regarding any of the information in this manual or concerns pertaining to the safety and/or use of this equipment, please contact your local PENTAX representative.

CAUTION:

Federal (USA) law restricts this device to sale by, or on the order of a physician or other appropriately licensed medical professional.

CE

このCEマーキングはEC指令への適合宣言マークです。
The CE marking assures that this product complies with the requirements of the EC directive for safety.
Das CE Zeichen garantiert, daß dieses Produkt die in der EU erforderlichen Sicherheitsbestimmungen erfüllt.
Le logo CE certifie que ce produit est conforme aux normes de sécurité prévues par la Communauté Européenne.
Il marchio CE assicura che questo prodotto è conforme alle direttive CE relative alla sicurezza.
La marca CE asegura que este producto cumple todas las directivas de seguridad de la CE.
CE 标志意味着保证该类产品遵从欧洲共同体安全法规。

Symbol for “MANUFACTURER”

Symbol for “DATE OF MANUFACTURE”

Symbol for “AUTHORISED REPRESENTATIVE”

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1. SAFETY PRECAUTIONS- IMPORTANT ⚠

The following precautions should always be exercised with the use of all electro-medical equipment to ensure safety to all involved parties - user(s), patient(s), etc.

Please carefully read and follow this owner's manual.

1-1. TRAINING

This equipment should only be used under the supervision of a trained physician in a medical facility. Do NOT use in other locations or for any other purposes than the intended application.

1-2. INSTALLATION

1. This equipment should NEVER be installed or used in areas where the unit could get wet or be exposed to any environmental conditions such as high temperature, humidity, direct sunlight, dust, salt, etc., which could adversely affect the equipment.
2. This equipment should NEVER be installed or used in the presence of flammable or explosive gases or chemicals.
3. This equipment should NEVER be installed, used or transported in an inclined position nor should it be subjected to impact or vibration.
4. For safety reasons, this equipment must be properly grounded. (This equipment should be connected to a three (3) prong hospital grade receptacle in U.S.A. or Canada.)
5. Ensure that all power requirements are met and conform to those specified on the rating plate located on the rear panel.
6. Do NOT block the air intake vent of this equipment.
7. Do NOT allow the power cord to become twisted, crushed or pulled taut.
8. When using an isolation transformer for any ancillary equipment, ensure that the power requirements of the devices do not exceed the capacity of the isolation transformer. For further information, contact your local PENTAX distributor.

1-3. PRIOR TO USE

1. Confirm that this equipment functions properly and check the operation of all switches, indicators, etc.
2. To prevent electrical shock when used with endoscopes, this equipment is insulated (type BF electro-medical equipment). Do NOT allow it to be grounded to other electrical devices being used on the patient. Rubber gloves should always be worn to prevent grounding through user(s).
3. Confirm that other devices used in conjunction with this equipment function properly and that these other devices will not adversely affect the operation or safety of this equipment. If any component of the endoscopic system is not properly functioning, the procedure should not be performed.
4. Check and confirm that all cords or cables are connected correctly and securely.
5. The lamp life when used in this equipment is 400 hours. Prior to use, check the lamp life indicator on the front panel to ensure the indicator is lit green or yellow. After 400 hours of use, the indicator turns red and the image quality will deteriorate. Excessive use of the lamp beyond its rated 400 hours (approaching a thousand hours of use or more) could cause the lamp to explode resulting in damage to the video processor.

NOTE - *The lamp life rated at 400 hours, is applicable to the EPK-1000 processor with serial number beginning with UB and EB.*

1-4. DURING USE

1. To prevent electric shock, the endoscope and/or any other ancillary device should NEVER be applied directly to the heart.
2. Make sure that no contact is made between the patient and this equipment.
3. To avoid damage to the luminous display and flat membrane switches, do NOT press any keys with any sharp or pointed objects.
4. The light emitted by the Xenon lamp is extremely intense. Avoid looking directly at the light exiting the endoscope and/or this equipment.

5. To protect the users eyes and avoid risk of thermal injury during an endoscopic examination, use only the minimum amount of brightness required.
6. During clinical procedures, avoid unnecessary prolonged use which could compromise patient/user safety.
7. Continually monitor this equipment and the patient for any signs of irregularities.
8. In the event that some type of irregularity is noted to the patient or this equipment, take the appropriate action to ensure patient safety.
9. If the operation of any of the components of the endoscopic system fails during the procedure and the visualization of the procedure is lost or compromised, place the endoscope in the neutral position and slowly withdraw the endoscope.
10. This equipment should only be used according to the instruction and operating conditions described in this manual. Failure to do so could result in compromised safety, equipment malfunction or instrument damage.

1-5. AFTER USE

1. Refer to the operating instructions supplied with all the components of the endoscopic system to establish the right order in which components should be turned OFF. Some peripheral devices may have to be turned OFF first to avoid compromising their operation.
2. Wipe all surfaces clean with gauze slightly dampened with alcohol.
3. Be sure connector interfaces and ventilation ports are not allowed to become wet or splashed with liquids.

1-6. STORAGE

1. This equipment should NEVER be stored in areas where the unit could get wet or be exposed to any environmental conditions such as high temperature, humidity, direct sunlight, dust, salt, etc., which could adversely affect the equipment.
2. This equipment should NEVER be stored in the presence of flammable or explosive gases or chemicals.
3. This equipment should NEVER be stored or transported in an inclined position, nor should it be subjected to impact or vibration.
4. Cords, accessories, etc., should be cleaned and neatly stored.
5. This equipment should be maintained in a clean condition during storage and be ready for subsequent use.

1-7. SERVICE

1. Alterations/modifications to the equipment should NEVER be made. Repairs should only be performed by an authorized PENTAX service facility.
2. When replacing the lamp, use only the lamp recommended by PENTAX and follow all PENTAX instructions provided.

1-8. MAINTENANCE

Periodically this equipment and any applicable accessories should be inspected for operation and safety.

1-9. DISPOSAL

The equipment should be returned for disposal to PENTAX. Contact your local PENTAX representative or service facility.

An information on Disposal for users in the European Union

This product is a medical device. In accordance with European Directive 2002/96/EC on Waste Electrical and Electronic Equipment, this symbol indicates that the product must not be disposed off as unsorted waste, but should be collected separately. Contact your local PENTAX distributor for correct disposal and recycling.

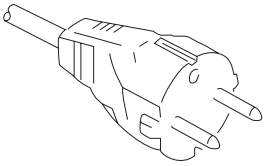
By disposing of this product correctly you will help ensure that the waste undergoes the necessary treatment, recovery and recycling and thus prevent potential negative effects on the environment and human health which could otherwise arise due to inappropriate waste handling.

1-10. FOR THE STATE OF CALIFORNIA, USA ONLY

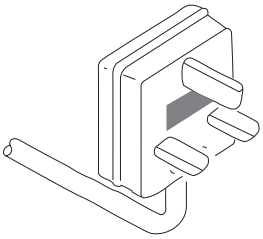
Perchlorate Material-special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate.
Perchlorate Material: Lithium battery contains perchlorate.

POWER REQUIREMENTS

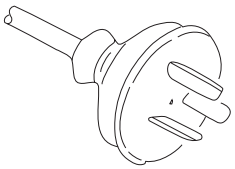
Check the standard power plug configurations that are used in your country. If the appropriate power cord is not included in your product, notify your local PENTAX distributor.



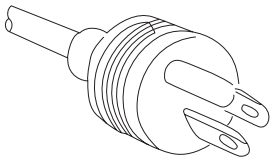
Continental Europe
(Use a SEV approved plug for Switzerland)



U.K.



Australia
and
New Zealand



U.S.A. and
Canada
(Hospital Grade)

SYMBOLS ON MARKING

Alternating current

Type BF applied part (Safety degree specified by IEC 60601-1)

OFF (Power : disconnection from mains)

ON (Power : connection to the mains)

Attention, consult Owner's Manual

Dangerous Voltage

Protective earth (ground)

Equipotentiality

CONVENTIONS

The following conventions have been established in the text of this manual to aid in the identification of potential hazards of operation;

WARNING : Could result in death or serious injury.

CAUTION : May result in minor or moderate injury or property-damage.

NOTE : May result in property-damage. Also, advises owner/operator about important information on the use of this equipment.

1. PRECAUTIONS DE SECURITE-IMPORTANT ⚠

Les précautions suivantes doivent toujours être obeervées lors de l'utilisation de tout matériel médical électrique susceptible d'être utilisé avec cet appareil, pour assurer à toutes les personnes concernées (utilisateus, patients, etc...) une sécurité maximale.

Veuillez lire et suivre attentivement les recommandations du manuel d'utilisation.

1-1. FORMATION

L'appareil ne doit être utilisé que sous la surveillance d'un médecin expérimenté, dans un établissement médical. Ne pas utiliser dans un autre endroit ou pour toute autre application pour laquelle il n'est pas prévu.

1-2. INSTALLATION

1. L'appareil ne doit JAMAIS être placé ou utilisé dans un endroit où il serait mouillé ou exposé à l'humidité, à une température élevée, à la lumière solaire directe, à la poussière, au sel, etc., qui pourraient l'endommager.
2. L'appareil ne doit JAMAIS être placé ou utilisé en présence de gaz ou de produits chimiques inflammables ou explosifs.
3. L'appareil ne doit JAMAIS être placé, utilisé ou transporté en position inclinée, ni être soumis à des chocs ou des vibrations.
4. Pour des raisons de sécurité, l'appareil doit être correctement relié à la terre (cet appareil doit être branché dans une prise secteur 3 broches aux normes Hôpital aux U.S.A. et au Canada).
5. Assurez-vous que les spécifications électriques de la prise secteur sont conformes à celles indiquées à l'arrière de l'appareil.
6. Ne pas obturer les orifices de ventilation de l'appareil.
7. Ne pas écraser, plier ou tendre le cordon secteur.
8. Dans le cas ou un transformateur d'isolement est utilisé pour le matériel périphérique, vérifier que la puissance totale de l'installation ne dépasse pas la capacité du transformateur. Pour de plus amples informations, contacter votre distributeur PENTAX.

1-3. AVANT UTILISATION

1. Vérifier le fonctionnement de l'appareil et de ses interrupteurs, afficheurs, voyants, etc...
2. Pour prévenir les risques de chocs électriques lorsqu'il est utilisé avec des endoscopes, cet appareil doit être installé comme "Matériel électrique médical type BF". Ne pas le relier aux autres appareils électriques utilisés pour le même patient. Les utilisateurs doivent s'isoler électriquement en portant des gants de caoutchouc.
3. Vérifier le fonctionnement des périphériques utilisés avec l'appareil et s'assurer qu'ils n'en perturbent pas le fonctionnement et la sécurité. Si l'une des composantes du système endoscopique ne fonctionne pas correctement, interrompre l'utilisation.
4. Vérifier le branchement des différents câbles de liasions (vidéo, secteur, contrôle, etc...).
5. La durée de vie nominale de la lampe est de 400 heures. Avant utilisation, vérifier que le témoin de durée de vie vert ou jaune est allumé. A partir de 400 heures, le témoin rouge s'allume et la qualité d'image diminue. Une utilisation excessive de la lampe au-delà de 400 heures (approchant plusieurs milliers d'heures) peut être à l'origine d'une explosion de la lampe pouvant provoquer des dommages au vidéoprocesseur.

NOTE *- La duré de vie de la lampe estimée à 400 heures s'applique aux processeurs EPK-1000 dont le numéro de série commence par UB et EB.*

1-4. PENDANT L'UTILISATION

1. Pour éviter les risques de choc électrique, l'endoscope et/ou tout autre périphérique utilisé conjointement avec l'appareil ne doivent JAMAIS être placés directement sur le coeur.
2. Ne pas mettre le patient en contact avec l'appareil.
3. Pour conserver l'afficheur et le clavier souple en bon état, ne pas presser les touches du tableau avec un objet pointu ou tranchant.
4. Eviter de regarder directement la lumière sortant de l'endoscope et/ou de l'appareil du fait de la forte luminosité émise par la lampe Xénon.
5. Pour protéger l'utilisateur et éviter toute blessure thermique pendant l'examen, régler la luminosité au minimum nécessaire.
6. Eviter une utilisation prologée de l'appareil si elle n'est pas indispensable, pour ne pas compromettre la sécurité du patient et de l'utilisateur.
7. Surveiller en permanence l'appareil et le patient pour prévenir tout signe de dysfonctionnement.
8. En cas de problème avec le patient ou l'appareil, prendre toutes les mesures nécessaires pour préserver la sécurité du patient.
9. Si un problème de fonctionnement survient sur l'un des appareils du système endoscopique et que l'image est interrompue ou altéree, placer l'endoscope en position neutre et retirer doucement.
10. Cet appareil doit toujours être utilisé selon les instructions et conditions de fonctionnement décrites dans ce manuel. Ne pas les suivre peut compromettre la sécurité, le fonctionnement du matériel, ou endommager l'appareil.

1-5. APRES UTILISATION

1. Veuillez vous référer aux instructions fournies avec chaque composante du système endoscopique afin d'éteindre les composantes dans l'ordre adéquat. Certains périphériques peuvent devoir être éteints d'abord pour ne pas compromettre leur fonctionnement.
2. Essuyer les appareils avec une compresse légèrement imbibée d'alcool.
3. Vérifier que les connecteurs et les orifices de ventilation sont à l'abris des projections de liquides.

1-6. STOCKAGE

1. L'appareil ne doit JAMAIS être rangé à l'humidité, à température élevée, à la lumière solaire directe, la poussière, le sel, etc., qui pourraient l'endommager.
2. L'appareil ne doit JAMAIS être rangé en présence de gaz ou de produits chimiques explosifs.
3. L'appareil ne doit JAMAIS être rangé en position inclinée ni être soumise à des chocs ou des vibrations.
4. Les accessoires et les câbles doivent être nettoyés et rangés correctement.
5. L'appareil doit être maintenu en parfait état de propreté durant le stockage, et tenu prêt pour l'utilisation suivante.

1-7. SERVICE

1. Ne JAMAIS modifier ou altérer l'appareil. Les réparations éventuelles ne doivent être effectuées que par un service aprés-vente PENTAX.
2. Le remplacement de la lampe ne doit être effectué que par une lampe agréée par PENTAX et en sulvant les instructions fournies par PENTAX.

1-8. MAINTENANCE

Périodiquement, cet appareil et tous les périphériques associés doivent être vérifiés en fonctionnement et en sécurité.

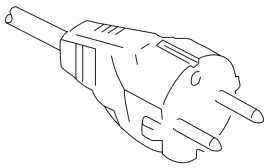
1-9. ÉLIMINATION

Ce matériel doit être retourné à PENTAX pour élimination. Contacter PENTAX ou votre Agence PENTAX locale.

Information concernant l'élimination des produits dans l'Union européenne.
Ce produit est un dispositif médical. En conformité avec la Directive européenne 2002/96/CE relative aux déchets d'équipements électriques et électroniques, ce symbole indique que le produit ne doit pas être éliminé comme un déchet non trié, mais qu'il doit faire l'objet d'une collecte sélective. Contactez votre distributeur PENTAX local pour avoir des informations concernant la procédure correcte d'élimination et de recyclage. En éliminant ce produit correctement, vous contribuerez à garantir que ce déchet est soumis au traitement, à la valorisation et au recyclage nécessaires, empêchant ainsi les effets négatifs potentiels pour l'environnement et la santé des personnes qui résultent de la gestion inappropriée des déchets.

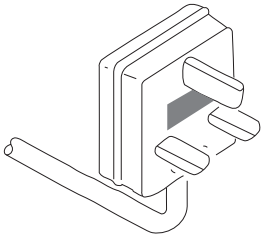
ALIMENTATION NECESSAIRE

Vérifier le type de prise de courant utilisé dans votre pays. Si le cordon secteur approprié n'est pas fourni avec votre appareil, contactez votre distributeur PENTAX.

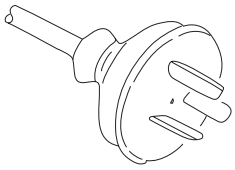


Europe Continentale

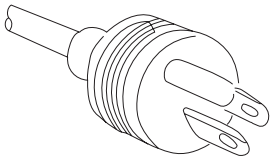
(Utiliser une tiche homologuée SEV pour la Suisse)



Royaume - Uni



Australie
et
Nouvelle Zélande



USA et Canada
(Normes Hôpital)

SYMBOLES UTILISES:

Courant alternatif

Élément type BF (Niveau de sécurité spécifié par la norme IEC60 601-1)

"OFF" (Alimentation : déconnectée du secteur)

"ON" (Alimentation : connectée au secteur)

Attention : consulter le manuel d'utilisation

Voltage dangereux

Mise à la terre de protection

Equipotentialité

CONVENTIONS

Les conventions suivantes ont été adoptées dans le texte de ce manuel, afin d'aider á l'identification des risques potentiels liés à l'utilisation;

WARNING : Peut causer la mort ou une blessure grave

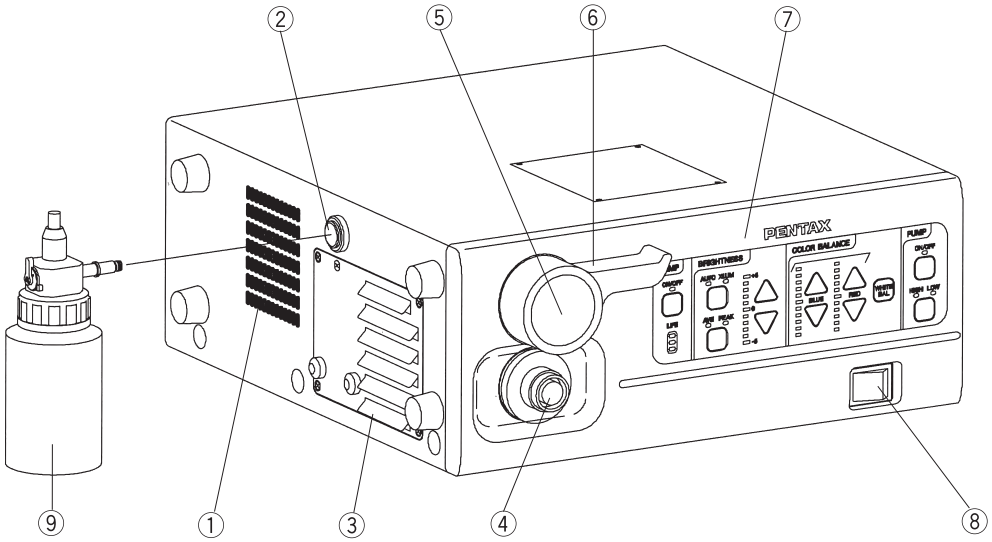
CAUTION : Peut causer une blessure légère à modérée ou des dégâts au materiel

NOTE : Peut causer des désgâts au matériel. Donne aussi à l'utilisateur des informations sur les appareils

2. NOMENCLATURE, CONTROLS AND FUNCTIONS

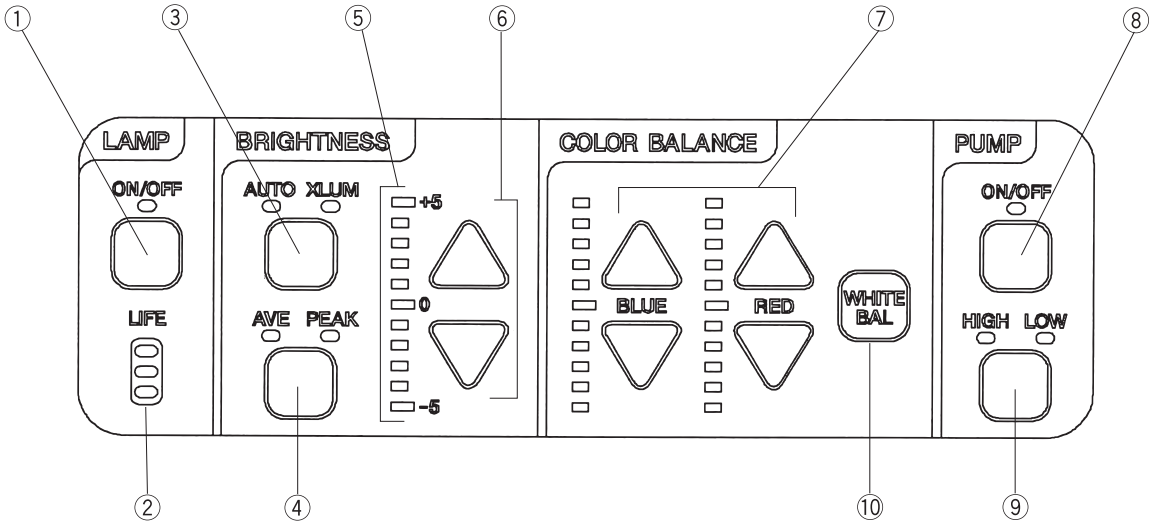
2-1 VIDEO PROCESSOR

(1) MAIN BODY



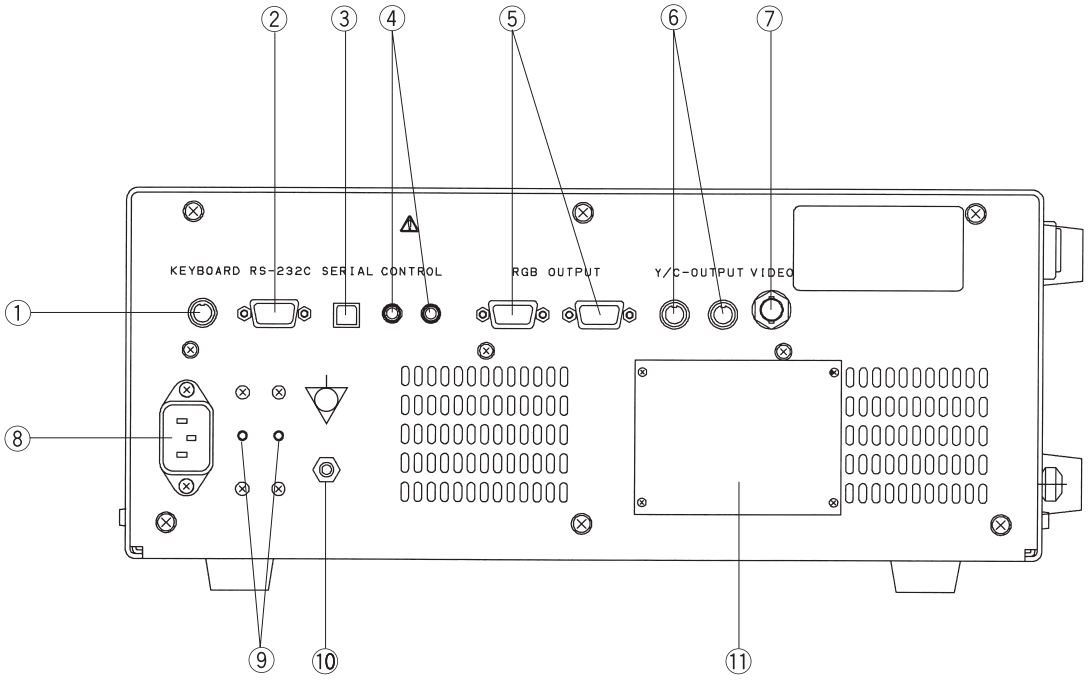
No.	NAME	FUNCTION
1	Ventilation Grid	allows for adequate ventilation and cooling lamp/unit. Do NOT block the grids.
2	Water Bottle Receptacle	accepts air pipe from PENTAX water bottle assembly.
3	Lamp Housing Cover	provides access to replace lamp cartridge.
4	Light Guide Attachment	AE-P1 adapter for standard PENTAX endoscopes. Port accepts video endoscope or fiberscope light guide. Adapter can be changed for use as light source for other manufacturer's endoscopes or for use with fiberscope video adapter module.
5	Endoscope Electrical Connector	accepts Color video endoscope electrical connector or fiberscope video adapter module electrical connector. *CAUTION - Always turn ON the power switch after connecting an endoscope. Also, remove the endoscope from the processor after turning OFF the power switch.* *- When you take the light guide out of this socket, the sleeve of the light guide might be hot. Take the light guide out of the socket with caution.*
6	Scope Locking Lever	Open the lever before setting or removing an endoscope. After connecting the endoscope to the processor, close the lever. *NOTE - After connecting the endoscope to the EPK-1000 video processor, always make sure that the endoscope is firmly secured to the scope receptacle by turning the locking lever to the "lock" position.*
7	Front Panel	See the section 2-1- (2)
8	Power Switch	The processor is turned | : ON, or O : OFF. Switch lights green when switched ON. Switch should not be hit with objects like endoscope light guides, when being switched ON or OFF. *NOTE - Always turn ON the power switch after connecting an endoscope. Also, remove the endoscope from the processor after turning OFF the power switch.* *- Before turning the EPK-1000 power ON, ensure the air flow vents are not obstructed.* *NOTE -Aside from the pre-use inspection of the equipment, the lamp in the video processor should be turned OFF when the video system is not clinically used.*
9	Water Bottle	See the section 2-2.

(2) FRONT PANEL



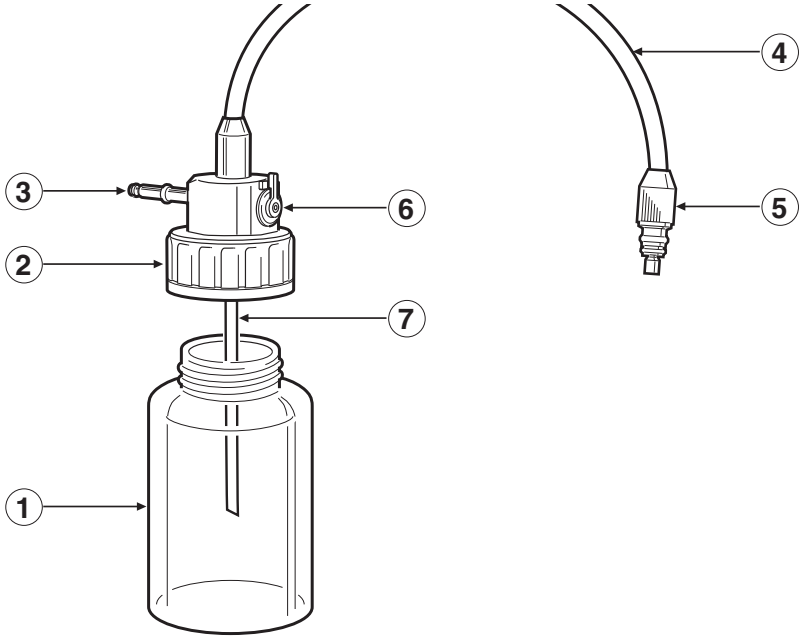
No.	NAME	FUNCTION
1	Lamp Switch	ignites the main lamp. The LED lights green when switched ON. When the main lamp fails to ignite, the LED flashes. Press the lamp switch again to ignite the auxiliary lamp. NOTE *-Aside from the pre-use inspection of the equipment, the lamp in the video processor should be turned OFF when the video system is not clinically used.* NOTE *-The auxiliary lamp is incorporated to the processor with serial number beginning UB and EB.*
2	Lamp Life Indicator	indicates hours for Xenon lamp installed in video processor. If the indicator lights red, a lamp should be replaced before beginning the next procedure.
3	AUTO/XLUM Select Switch	selects AUTO (automatic) or XLUM (manual) brightness control mode. AUTO or XLUM indicators will light to indicate which is selected.
4	AVE/PEAK Select Switch	Selecting AUTO will require selection of light measuring method, AVERAGE or PEAK. AVE or PEAK indicator lights to indicate which is selected. AVERAGE: the brightness level is adjusted with respect to an averaging of the brightness of the video signal. PEAK: the brightness level is adjusted with respect to the brightness of the peak of the screen.
5	Brightness Indicator	indicates the brightness level settled by the user.
6	Brightness Adjustment Switch	controls the brightness level. Up or Down button will change the brightness level as shown on the brightness indicator. △ increases the brightness level. ▽ descreases the brightness level. NOTE *-Minimum reguired brightness should be used at all times to avoid risk of injury to the patient.*
7	Color Balance Switch	adjusts the video image color, Blue or Red by +/- 5 steps.
8	Pump on/off	controls air pumps on/off. LED on the switch will light when switched ON.
9	Pump high/low	LED on the switch indicates the pump output pressure level, High/Low. ⚠WARNING *-When selecting HIGH pressure, be careful not to deliver too much air.*
10	White Balance Switch	adjusts the white balance of the video endoscope. After adjustment, "WB OK!" is displayed for about 3 seconds.

(3) REAR PANEL



No.	NAME	FUNCTION
1	Keyboard Connector	accepts the keyboard supplied by PENTAX.
2	Interface Connector	RS-232C serial interface connector.
3	Serial Bus	NTSC or PAL Serial Digital Video out connector for a still-frame video image .
4	Control	is activated by either the endoscope control buttons (C, V) or the keyboard copy key to control peripherals.
5	RGB Video Output	NTSC or PAL RGB video out connectors, 9-pin D-sub Female connectors.
6	Separated Video Output	Y/C video out connector (4-pin S connector)
7	Composite Video Output	NTSC or PAL composite video out connector, BNC type connector.
8	Power Input Socket	accepts AC power cord.
9	Breaker	activates with a red button sticked out when abnormal current flows. *CAUTION -When the breaker is activated, try to reset first. If the breaker activates again when the processor is turned ON, do NOT use the processor and return it to PENTAX.*
10	Potential equalization terminal	For safety purposes, this terminal is connected to a potential equalization busbar of the electrical installation.
11	Rating Plate	displays unit model number, serial number and power requirements.

2-2 WATER BOTTLE ASSEMBLY, MODEL OS-H4

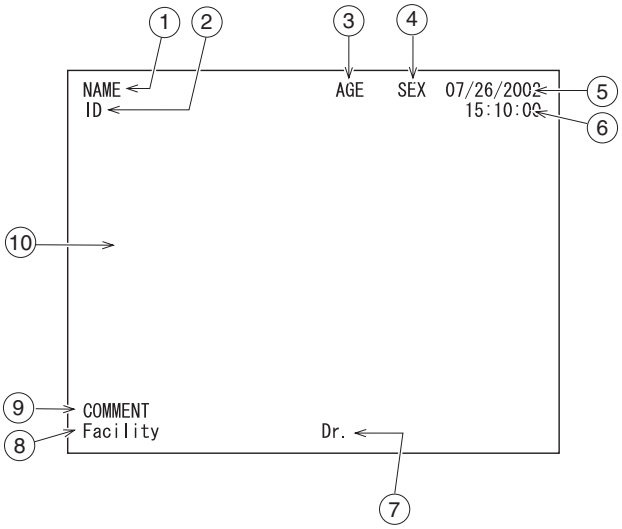


No.	NAME	FUNCTION
1	Bottle	holds sterile water for procedure. (use up to 2/3's full)
2	Water Bottle Cap Assembly	must be firmly secured to bottle to prevent air leakage. Do NOT overtighten the bottle cap.
3	Air Pipe Stem	inserts into video processor water bottle receptacle.
4	Air/Water Hose	contains (2) independent tubes - 1 for air, 1 for water.
5	Air/Water Connector	inserts into Air/Water socket of endoscope umbilical connector.
6	Air/Water- Drain Lever	must be set to upright (A/W) position for delivery of air and water.
7	Water Feeding Stem	channel for water to be displaced from bottle and into scope.

NOTE - If the water bottle assembly has been handled roughly, the water feeding tube inside the Air/Water hose may be disconnected at the A/W connector for the endoscope. To test, remove the cap assembly and using a syringe, inject water into the water feeding stem. If the water comes out of both the center hole of the A/W connector and the series of holes around the center hole, the water feeding tube is disconnected. Use another water bottle assembly.

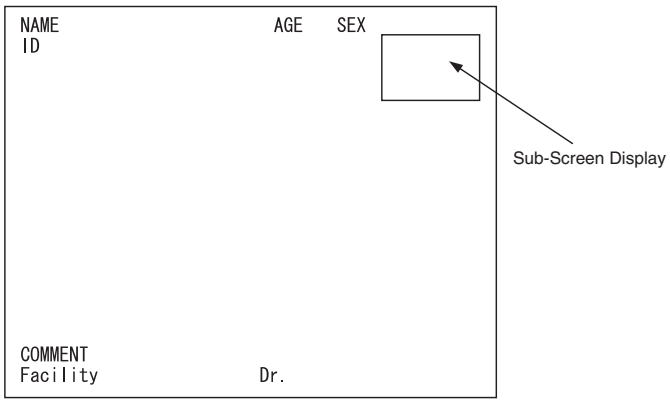
2-3 MONITOR DISPLAY SCREEN

(1) NORMAL



No.	NAME	FUNCTION
1	NAME	Alpha-numeric field, 24 characters long.
2	ID	Alpha-numeric field, 12 characters long.
3	AGE	Alpha-numeric field, 3 characters long.
4	SEX	Alpha-numeric field, 1 character long.
5	Date	Numeric field
6	Clock	Military format, Hours: Minutes: Seconds.
7	Doctor's Name	Alpha-numeric field, 12 characters long.
8	Facility	Alpha-numeric field, 12 characters long.
9	COMMENT	Alpha-numeric field, 40 characters long.
10	Main Screen	Endoscopic image will be displayed on the monitor screen.

(2) FREEZE (SUB-SCREEN DISPLAY)

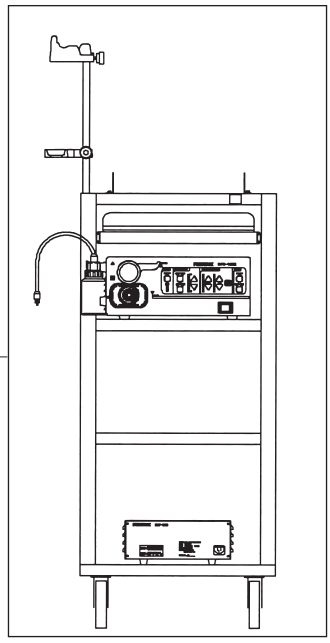


Endoscopic image will be displayed to this area of the monitor screen when freeze function is activated.

NOTE - *Appearance of sub-screen covers Date and Clock.*

3. PREPARATION AND SAFETY CHECK
3-1 PREPARATION

⚠*WARNING* - *PENTAX video processors are electro-medical devices incorporating delicate components and sophisticated circuitry that should not be subjected to harsh conditions, including excessive vibrations and/or severe impact. NEVER drop this equipment or subject it to severe impact as it could compromise the functionality and /or safety of the unit. Should this equipment be mishandled or dropped, do NOT use it. Return it to an authorized PENTAX service facility for inspection and repair.*



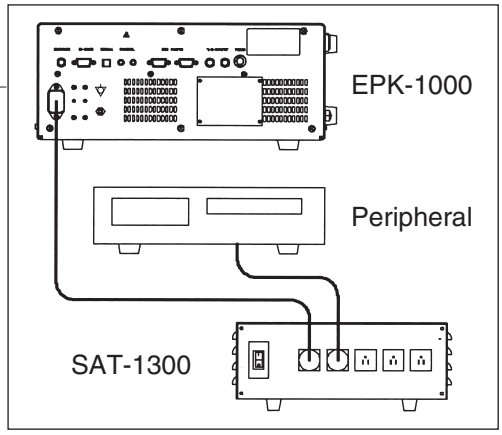
(1) SETTING UP THE VIDEO PROCESSOR

1. Place the video processor on a stable and level surface (cart, counter, stand,etc..).

NOTE

- *Avoid places where the video processor may be splashed with liquid.*
- *Absolutely do NOT use in any environment with explosive or flammable gases.*
- *Avoid places where the unit could be exposed to high temperature, humidity, direct sun light, etc.*
- *Do NOT install, operate or store electro-medical equipment in a dusty environment. Accumulation of dust within these units may cause malfunction, smoke, or ignition.*
- *Do NOT block the venting grids on the sides of the processor.*
- *When moving the video processor, do NOT hold the scope locking lever.*

2. Make sure the power switch is OFF.
3. Plug the power cord into the power source using the three (3) prong plug supplied with the unit.
4. Ensure the keyboard is connected properly.



⚠*WARNING*

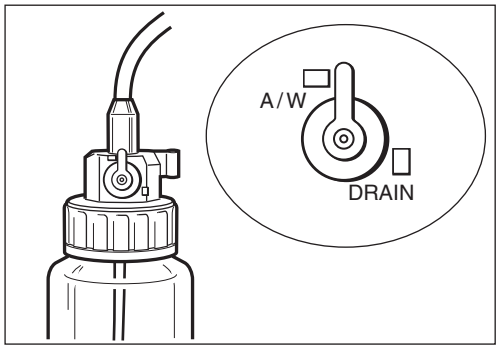
- *To reduce the potential for the electric shock, connect the power cord of the following peripheral components into the medical isolation transformer supplied.*
  - *– Any peripheral components connected to the PENTAX Processor.*
  - *– Any peripheral components connected to the PENTAX Endoscope.*
  - *– NEVER connect other components to the isolation transformer.*
- *Check that the total power consumption of all connected devices does not exceed the isolation transformers' power rating.*
- *Make sure that outputs are in compliance with IEC 60601-1-1.*
- *Make sure that the power cord is connected to the main with a three (3) prong plug (In the U.S.A use UL 2601-1 rated isolation transformers and/or power strips only).*

(2) CONNECTING THE WATER BOTTLE

1. Fill the water bottle approximately 2/3 full with sterile water.
2. Screw the water bottle cap assembly to the water bottle snugly.

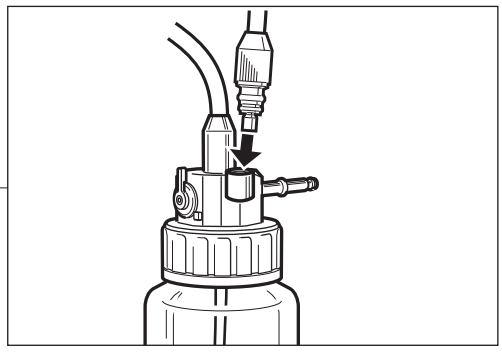
NOTE - *Do NOT overtighten the water bottle cap*

3. Set the Air/Water- Drain lever to A/W position.
4. Insert the water bottle air pipe stem into the video processor water bottle receptacle and press until the water bottle 'clicks' into position.



NOTE - *Do NOT press the water bottle too forcefully into the video processor. Rough handling may cause water to leak onto/into the video processor.*

5. Insert the Air/Water connector into the holder on the water bottle cap assembly until the endoscope is connected



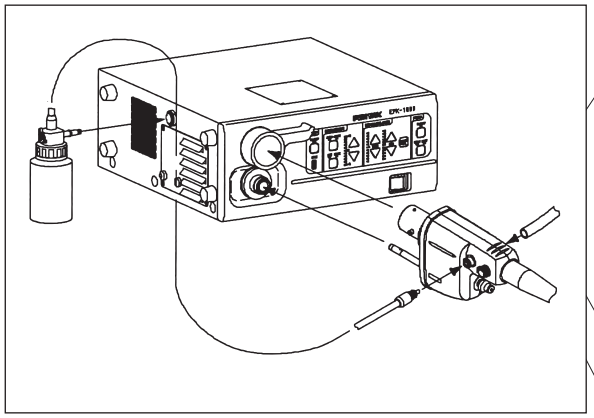
NOTE - *Always disconnect the water bottle before moving the processor into a position not common to normal use.*
Always disconnect the water bottle before packing the video processor for shipment.

(3) CONNECTING THE ENDOSCOPE

CAUTION - *Always turn ON the processor after connecting an endoscope. Also, remove the endoscope from the processor after turning OFF the power switch.*

1. Check to ensure that the appropriate light guide adapter is mounted to the video processor. The adapter, AE-P1 is already attached to the video processor.

NOTE - *Connecting a video endoscope without a light guide adaptor in place will reduce light output at the endoscope distal end. Attempting to connect a fiberscope without a light guide adapter and/or an appropriate light guide sleeve in place will damage the fiberscope and the video processor.*



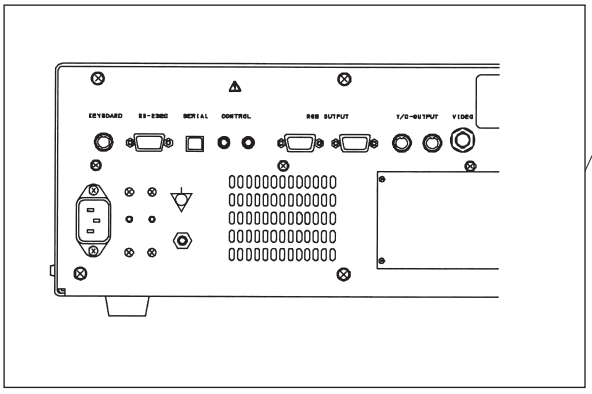
2. Check to ensure that the scope locking lever is open.
3. Connect the scope firmly into the processor until it clicks into position.
4. Close the scope locking lever

NOTE - *After connecting the endoscope to the EPK-1000 video processor, always make sure that the endoscope is firmly secured to the scope receptacle by turning the locking lever to the "lock" position.*

NOTE - *If using the fiberscope video adaptor module, make sure the eyepiece of the fiberscope is properly connected to the module (use adapters as required). Connect the electrical connector of the module to the electrical connector of the video processor, lining up the red dots on each.*

5. Connect the water bottle Air/ Water connector to the Air/Water receptacle on the endoscope's umbilical connector.
6. Connect the suction tube of the suction device to the suction nipple on the umbilical connector of the endoscope.

(4) CONNECTING THE PERIPHERAL EQUIPMENT



1. Referring to the rear panel diagram, connect a TV monitor and other required equipment such as hard copy equipment, VCR, etc., to the processor.

CAUTION - *When used in clinical or residential areas near radio and TV receiver units, this equipment may be subjected to radio interference.*

- *To reduce electromagnetic interference, do NOT keep turning ON the main POWER SWITCH of the equipment while a videoscope is connected but not ready for use.*
- *To avoid and resolve adverse electromagnetic effects, do NOT operate this equipment near the RF energy equipment.*

CAUTION : *FOR EUROPE*

- *This equipment is a Class B Medical Equipment (specified EN55011) and is intended for hospital or health care districts.*
- *Use the connection cables as specified below.*

Composite Video Cable (1.5m), RGB Video Cable (1.5m), Y/C Video Cable (1.5m), Control (1,2) Cable (1.5m), RS-232C Cable (1.5m), Serial Bus Cable (1.5m).

CAUTION - *Do NOT connect a printer simultaneously to RS232C and Control terminal located on rear panel of the processor.*

CAUTION - *Do NOT connect two or more processors to a computer.*

3-2 PRE-USE SAFETY CHECKLIST

⚠WARNING - Before every use the following points should be checked. If any function or device in the video endoscope system does not perform properly, do NOT perform the endoscopic examination. Contact the manufacturer of the device, your PENTAX sales representative or a PENTAX service center before using the equipment for an endoscopic examination.

1. Ensure that power switch is OFF.
2. Ensure that video processor is placed in stable and level position.
3. Ensure that water bottle is properly prepared and connected.
4. Ensure that endoscope (and fiberscope video adaptor module if applicable) is connected properly.

NOTE - After connecting the endoscope to the EPK-1000 video processor, always make sure that the endoscope is firmly secured to the scope receptacle by turning the locking lever to the "lock" position.

5. Ensure that keyboard is connected properly.
6. Turn ON monitor and other peripheral devices.
7. Turn ON video processor power switch. Ensure that switch is lighted green and the sound of the ventilation fans can be heard.

⚠WARNING - After 400 hours of use, the image quality will deteriorate. Excessive use of the lamp beyond 400 hours (approaching a thousand hours of use or more) could cause the lamp to explode resulting in damage to the video processor.

NOTE - The lamp life rated at 400 hours, is applicable to the EPK-1000 processor with serial number beginning with UB and EB.

8. Ensure that video processor lamp life indicator lights green or yellow. If red, replace the lamp.

CAUTION - Always turn ON the processor after connecting an endoscope. Also, remove the endoscope from the processor after turning OFF the power switch.

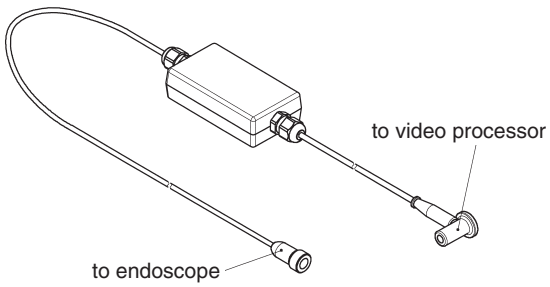
NOTE - Power function switches should not be activated by contact with objects like endoscope light guides when being switched ON or OFF. Before turning the video processor power ON, ensure the air flow vents are not obstructed.

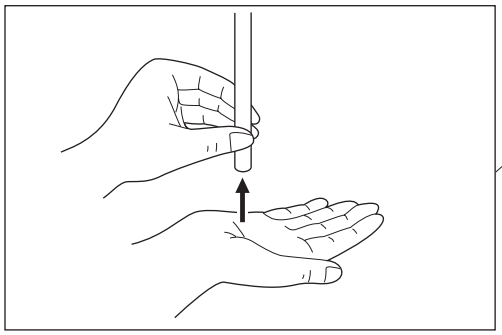
9. Turn on the lamp switch to ignite the lamp. If lamp fails to ignite, turn video processor OFF, wait 60 seconds and repeat steps 7 and 9.

NOTE - If lamp fails to ignite, do NOT attempt to perform an endoscopic examination, contact your PENTAX service facility.

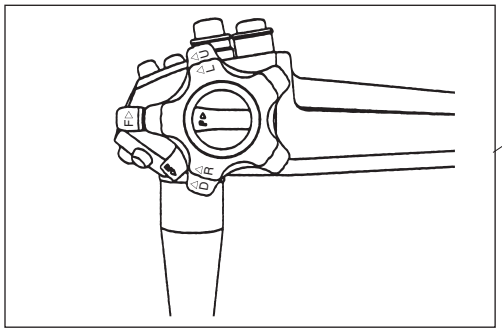
10. With lamp lit and endoscope connected, check for live endoscopic image on the monitor.

NOTE:
It should be recognized that the use of electro-surgical accessory devices employing high frequency current may interfere with the normal endoscopic image and this interference is not indicative of a malfunction of the video endoscope system. PENTAX has developed an earth cable, model OL-Z3 intended to reduce potential RF interference and electronic noise that may appear in the endoscope image when using electro-surgical devices. Ensure that cable OL-Z3 is correctly connected between the endoscope and video processor as described in the instructions provided with the OL-Z3.





11. Exercise the endoscope's automatic iris. Bring the tip of the endoscope within 1 cm off the palm of your hand and move it to about 5 cm away from the palm. Watch the image on the monitor to ensure the brightness at both distances is similar. Lift the distal end of the endoscope to the room lights, the light being emitted at the distal end of the scope should lower significantly (dependent on the ambient light levels in the room). Return the distal end of the endoscope to point at the palm and ensure that the light is being emitted from the distal end of the endoscope.

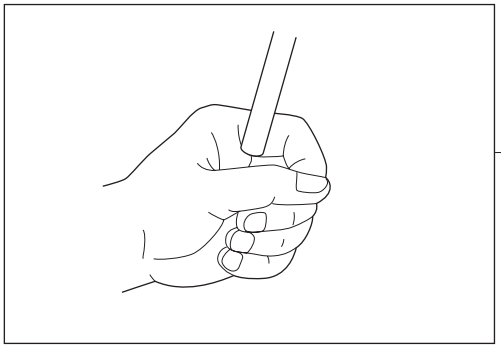


12. Check the endoscope control buttons positioned on the control body of the endoscope.

NOTE - *In combination with PENTAX 70K/72K/80K/81K/85K series endoscopes, the function of each button can be selected with the scope buttons key on the keyboard.*

13. Select brightness control auto or XLUM. If selecting AUTO, also select light measurement mode, average or peak. And exercise the brightness control switches to ensure that the brightness indicator and controls are functioning.

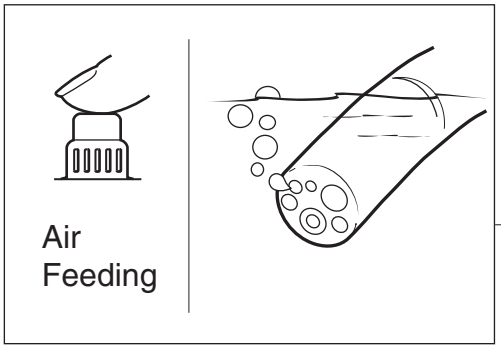
14. Exercise the color adjustment as described below.



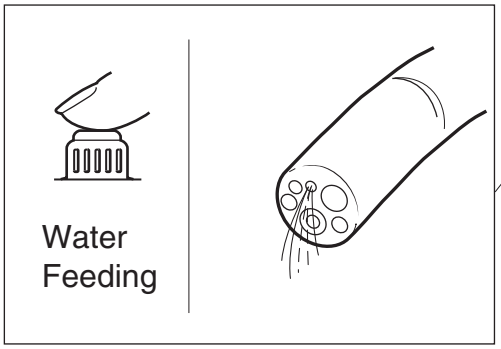
Cup the distal end of the endoscope loosely in your hand. Ensure that the monitor displays a natural color. Exercise the color adjust switches (Red Up and Down and Blue Up and Down) to ensure that the changes are recognizable in the image of your hand.

15. If XLUM is intended to be used during the procedure, exercise the XLUM function. Upon selecting the switch, LED will light and maximize the brightness level.

16. Turn ON the air pump on/off switch. The switch LED will light and the sound of the air pump should be heard. Select desired level, Low or High.



17. Exercise Air/Water delivery through the endoscope. Covering air venting hole on top of Air/Water button lightly should deliver air at the distal end of the endoscope by submerging the distal end in enough water to cover the tip, air flow will be demonstrated by a trail of bubbles. Pressing the button all the way down should deliver water through the tip of the endoscope.



NOTE - *Use only "fresh" distilled or sterile water for testing of the endoscope air/water delivery functions.*

If all items above appear to function satisfactorily, then the endoscopic procedure may be performed. If any functionality above is compromised, do NOT attempt to perform the endoscopic procedure.

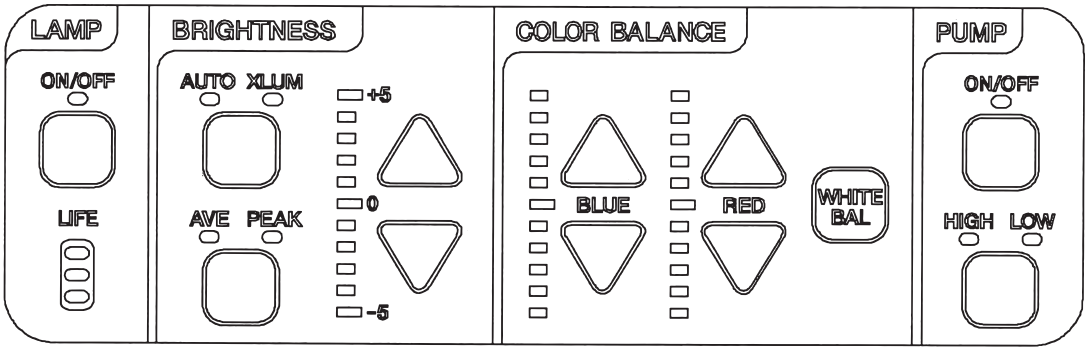
4. OPERATION

4-1 PROCESSOR FUNCTIONS

NOTE *- Check the lamp life indicator on the front panel. If red, a lamp should be replaced before beginning a procedure.*
- Before turning the processor ON, ensure the air flow vents are not obstructed.

⚠WARNING *- After 400 hours of use, the image quality will deteriorate. Excessive use of the lamp beyond 400 hours (approaching a thousand hours of use or more) could cause the lamp to explode resulting in damage to the video processor.*

NOTE *- The lamp life rated at 400 hours, is applicable to the EPK-1000 processor with serial number beginning with UB and EB.*



(1) MAIN LAMP

Turn ON the lamp switch to ignite main lamp and the LED on the lamp switch. The light will be emitted from the distal end of the endoscope. When the procedure is completed, turn OFF the lamp. If the lamp fails to ignite and the LED flashes, do NOT attempt to perform an endoscopic procedure.

NOTE *- Aside from the pre-use inspection of the equipment, the lamp in the video processor should be turned OFF when the video system is not clinically used.*

(2) AUXILIARY LAMP

If the LED on the lamp switch is flashing , it indicates that main lamp is burnt out or there is a lamp failure. The message "PUSH LAMP SWITCH" will be displayed on the monitor screen. While this error message is displayed, all function keys (except the lamp switch) are deactivated. To ignite the lamp, press the "LAMP SWITCH" - do NOT push the "POWER SWITCH" - while the LED is flashing. The auxiliary lamp and the LED will light.
Do NOT attempt to perform an endoscopic examination with auxiliary lamp. The auxiliary lamp is intended to assist in the safe withdrawal of the endoscope in the event that the main lamp fails to ignite during a procedure. After igniting the auxiliary lamp, return the endoscope to the neutral position and slowly withdraw the endoscope under controlled visualization by the auxiliary lamp. The auxiliary lamp can be turned OFF by pressing the switch or by turning the processor OFF.

⚠WARNING *- The auxiliary lamp is intended to provide sufficient visualization to withdraw the endoscope, should the main lamp fail. Do NOT attempt to perform an endoscopic examination with the auxiliary lamp.*

NOTE *- The auxiliary lamp is incorporated to the processor with serial number beginning with UB and EB.*

CAUTION *- The auxiliary lamp in the EPK-1000 incorporates a LED which is recognized as a class 2 laser product by IEC60825-1. Emission from the endoscope distal tip into the human body is at a level lower than class 2 as long as the lamp and all associated finished products are used properly according to provided instructions. To protect user's eyes, avoid looking directly at the light exiting the endoscope and/or the processor.*
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

(3) BRIGHTNESS

Select the desired brightness control mode, AUTO or XLUM, using the brightness control switch.

AUTO = Automatic brightness control, where the video signal of the endoscope will automatically maintain the brightness level selected by the brightness adjustment switches. The switch will beep when pressed and the AUTO indicator will light when the AUTO mode is selected.

If the AUTO brightness mode is selected, select the desired brightness level and the light measurement method, AVE or PEAK, using the light measurement switch on the front panel or the endoscope control buttons.

AVE = The brightness level is automatically adjusted with respect to an averaging of the brightness of the video signal.

PEAK= The brightness level is automatically adjusted with respect to a peak (maximum) value of the brightness of the video signal.

The switches will beep when pressed and the AVE or PEAK label will light when either is selected.

NOTE *- Halation is defined as the appearance of a halo around an area of extreme brightness. Halation may occur if the AVE mode and PEAK mode are selected. If halation is observed and if it distorts the endoscopic image, one should reduce the brightness level.*

XLUM= Manual brightness control, the user will select the brightness level by using the brightness adjustment switches.
The switch will beep when pressed and the XLUM label will light when manual mode is selected.

⚠WARNING *- To protect users eyes and avoid risk of thermal injury, select the Auto mode. When the processor is used as a light source, select the XLUM mode with the minimum required brightness. When the procedure is suspended for a while, turn OFF the lamp switch or select the XLUM mode with the lowest brightness.*

There are eleven (11) brightness levels. The brightness level will be displayed as a value -5 to +5 on the brightness indicator on the front panel.

To change the brightness level;
Press the Up switch (△) to increase the level.
Press the Down switch (▽) to decrease the level.
The switches will beep when pressed and the brightness level indicator will change accordingly.

CAUTION *- To protect the users eyes and avoid risk of thermal injury during an endoscopic examination, use only the minimum amount of brightness required.*

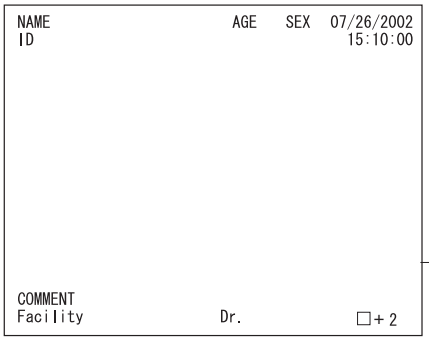
NOTE *- The video processor has a battery backup memory and will retain the last selected brightness value even if the unit is turned OFF or disconnected from the power outlet.*

(4) COLOR BALANCE

There are eleven (11) color levels for both Red and Blue hue.
They will be displayed as a value -5 to +5 on the monitor display at either end of the color bar.

All the switches described above will beep when pressed.

NOTE *- The video processor has battery backup memory and will retain the last selected color balance levels even if the unit is turned OFF or disconnected from the power outlet.*



The white balance function adjusts the white balance of each endoscope. Proper white balance requires the use of the white balance adjuster attached to the PENTAX System Cart. Contact your local PENTAX service center for the details if required.

1) Put the distal end of the video endoscope into the white balance adjuster which is supplied with the processor.
2) Watching the monitor, adjust the position of the distal end of the scope in the adjuster so that the circle at the bottom of the white balance adjuster can be recognized on the full screen.
3) Press the white balance switch while keeping the scope distal end stationary in the adjuster more than three seconds.
   If the white balance is established, “WB OKI” is displayed on the screen.

(5) PUMP

To turn the air pump On, press the Air Pump ON/OFF switch. The switch will beep when pressed. Then the LED on the switch will light and the sound of the air pump will be heard. To turn the air pumps OFF, press the ON/OFF switch again. The switch will beep and the LED on the switch will turn OFF.

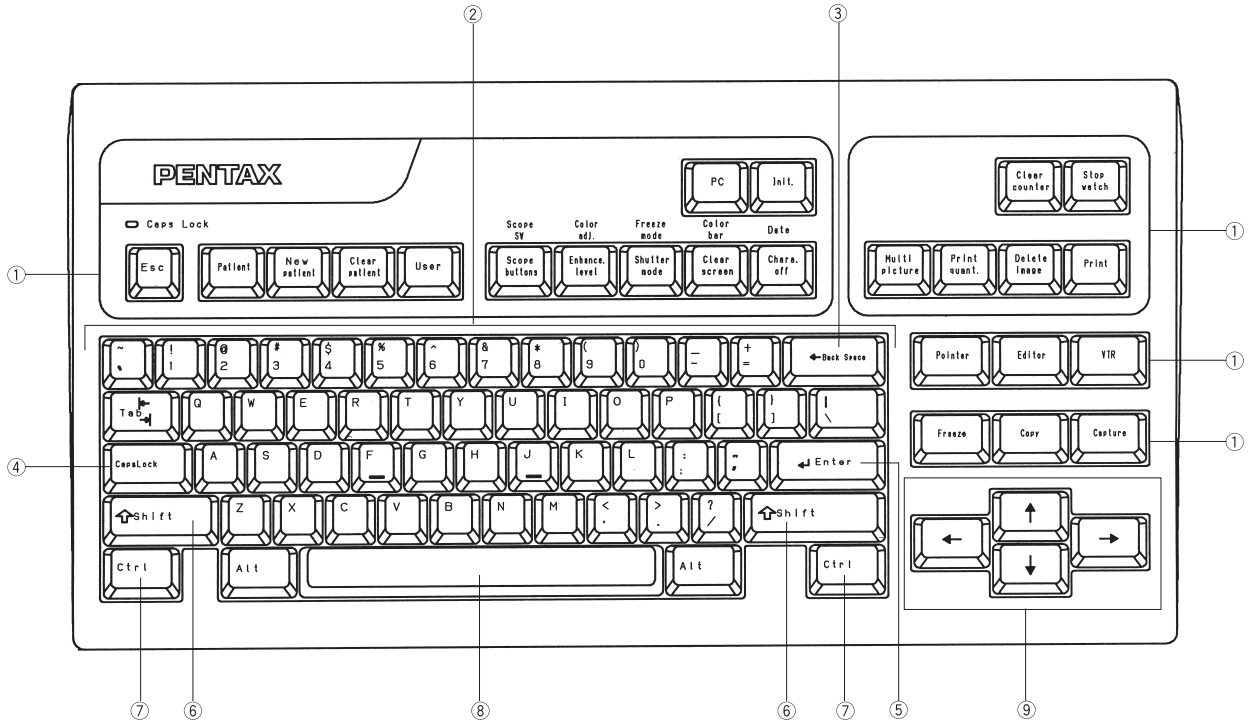
There are two (2) air pump levels, LOW and HIGH. The switches will beep when pressed and the LED on the level switch will light to indicate the selected level. The air pump level will control the pressure of both the air and water delivery.

CAUTION - Regardless of pump level setting selected, avoid delivering too much air to minimize the potential for pneumatic perforation or barotrauma.

NOTE - Should debris on the objective lens be difficult to clean, one can temporarily use a higher pump level setting on the video processor or light source. While doing so, simultaneously activate the air and suction control valves to minimize air insufflation. After the lens has been cleared return the air pressure to its original setting for routine use. Regardless of pump level setting selected, avoid delivering too much air.

4-2 KEYBOARD FUNCTIONS

(1) CONVENTIONAL KEYS



No.	NAME	FUNCTION
1	Function Keys	Refer to FUNCTION KEY INDEXES.
	Esc (Escape) Key	stops data entry or function menu. Returns to the normal mode.
2	Alpha-Numeric Keys	include keys for letters, numbers and special characters (brackets, commas, etc.) as well as command keys (Control, Shift, Enter etc.).
3	Back Space Key	moves cursor leftward and delete the character.
4	Caps Lock Key	Caps Lock indicator will light to show Caps Lock selected. When Caps Lock is ON, all alphabet keys will be typed to the monitor screen as capitals.
5	Enter Key	moves cursor to the next field or to store selected data.
6	Shift Keys	When Caps Lock is OFF, holding the Shift key and pressing alpha - numeric key will be typed to the monitor screen as a capital letter or the special character pictured on the key.
7	Ctrl (Control) Keys	is used to access function menus.
8	Space Bar	gives a space and deletes a previously typed character.
9	Cursor Movement Keys	Up, Down, Left and Right arrows move the cursor to each direction.

(2) SPECIAL FUNCTION KEYS

No.	Function Keys	Function
1	Patient	makes up Patient List
2	New Patient	inputs patient information
3	Clear Patient	deletes patient data
4	User	makes up User List
5	Scope Buttons	assign function to each scope control button
6	Scope SW (Ctrl+Scope Buttons)	select two controls (output terminals) on the rear panel
7	Enhance Level	selects enhance level
8	Color Adj (Ctrl+Enhance Level)	adjust color
9	Shutter Mode	changes shutter speed automatically
10	Freeze Mode (Ctrl+Shutter Mode)	selects freeze image Frame or Field
11	Clear Screen	displays items once removed from the screen
12	Color Bar (Ctrl+Clear Screen)	remove or display color bar
13	Character Off	clears all screen information
14	Date (Ctrl+Character Off)	set date and clock
15	PC	selects peripheral equipment to RS232C terminal
16	Init	initializes all data
17	Clear Counter	initializes the film counter
18	Stopwatch	activates stopwatch
19*	Multi Picture	sets number of split screens on video printer
20*	Print Quant	sets number of prints with video printer
21*	Delete Image	clears images currently stored in video printer
22*	Print	prints data already stored in video printer
23	Pointer	shows a small arrow (pointer) on the normal screen
24	Editor	enables input freely without any format restriction
25	VTR	activates output peripheral such as VTR
26	Freeze	activates freeze function
27	Copy	activates output peripheral such as copy
28	Capture	transmits a “frozen” endoscopic image to the PC connected to the processor.
29	Scope Model	displays model name and serial number of endoscope.

* applicable only when certain brand and model printers are connected to the PENTAX Video System.

Operation of Function Keys

1. Patient Key

NOTE *- If the Enter key is pressed during display of the normal screen, "Patient Information" is displayed without operation of the below (1), (2) & (3).*

1) Press the key to get "Patient List 1-10" .
2) Press the key repeatedly to scroll the list up to 11-20, 21-30.
3) Press Up/Down arrow key to move the cursor to the desired patient.
4) Press Right arrow key to get to "Patient Information" of the selected patient.
   4-1) Press Up/Down arrow key to move the cursor to the desired selection.
   4-2) Press alpha-numeric keys to input/change information.

NOTE *- While Capture function is activated, do NOT use the following special characters to input patient information such as patient name, patient ID.*

/ . * ? " < >

   4-3) Select ESC and press Enter key (or ESC key) to get back to "Patient List".
5) Press Up/Down arrow key to move the cursor to the desired patient.
6) Press Enter key to get back the normal screen of the selected patient.

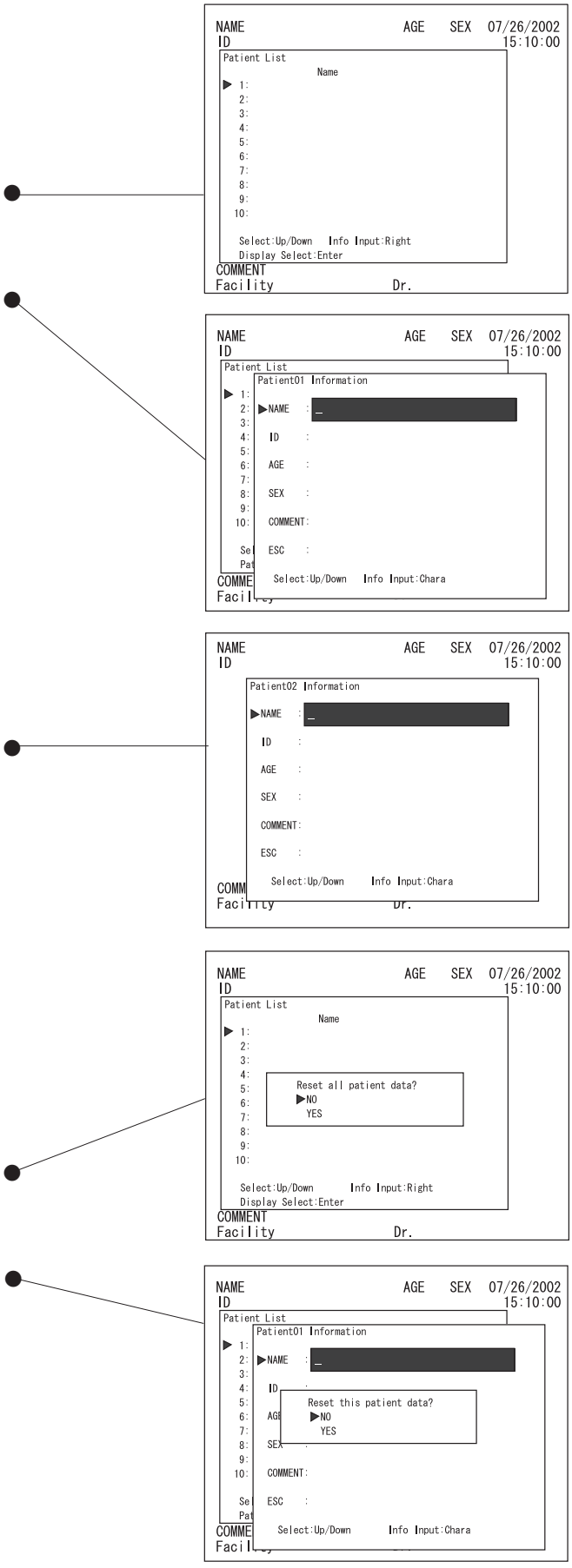
2. New Patient Key

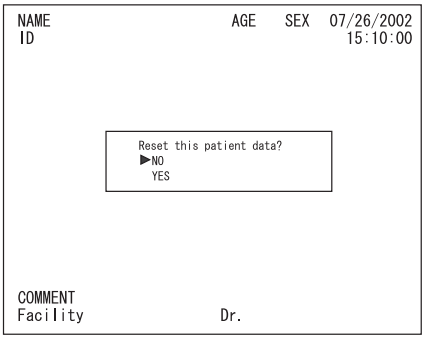
1) Press the key to get "Patient Information" .
2) Press Up/Down arrow key to move the cursor to desired selection.
3) Press alpha-numeric keys to input information.
4) Select ESC and press Enter key (or ESC key) to get back to the normal screen of the patient.

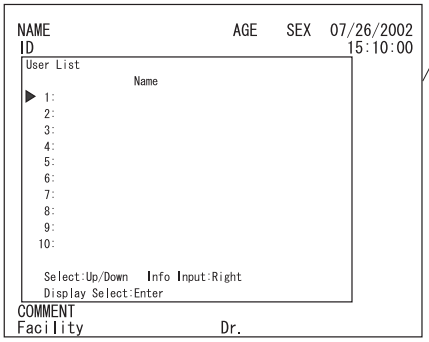
3. Clear Patient Key

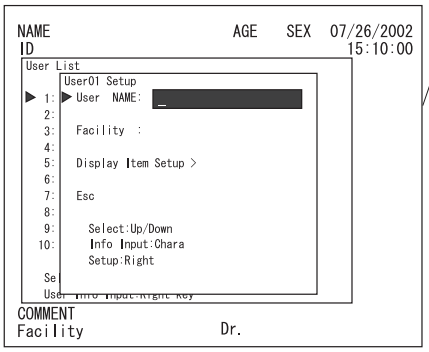
Function: Delete data on all patients when "Patient List" is displayed.
Delete data on one particular patient when "Patient Information" is displayed.

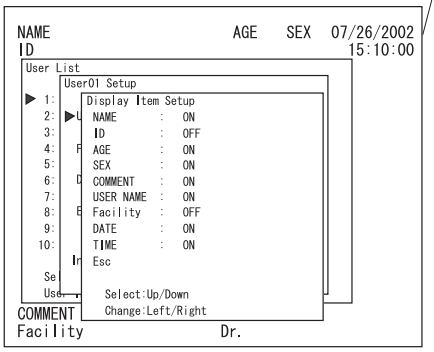
1) Press the key to be asked for confirmation.
2) Press Up/Down arrow key to move the cursor to the desired selection.
3) Press Enter Key to make selection.
   3-1) in case of Patient List
   • If Yes, data on all patients is deleted.
   • If No, the list retains the previous data.
   3-2) in case of Patient Information or normal screen
   • If Yes, data on the selected patient is deleted.
   • If No, the data on all patients is retained.
4) Select ESC and press Enter key (or ESC key) to exit the menu.

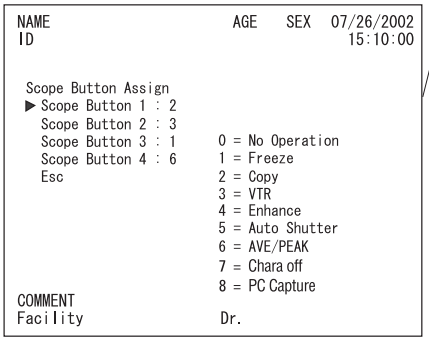












4. User Key

1) Press this key to get “User List 1-10”.
2) Press this key to scroll the list up to 11-20... 41-50.
3) Press Up/Down arrow key to move the cursor to the desired selection.
4) Press Right arrow key to get “User Setup”.
   4-1) Press Up/Down arrow key to the desired selection.
   4-2) Press alpha-numeric keys to input information.
   4-3) Press Right arrow key at “Display Item Setup” to get “Display Item Setup”.
      4-3-1) Press Up/Down arrow key to the desired selection
      4-3-2) Press Right/Left arrow key to select On or Off.
      4-3-3) Select ESC and press Enter key (or ESC key) to get back User Setup.
   4-4) At “User Setup”, select ESC and press Enter key (or ESC key) to get back to “User List”.
5) Press Up/Down arrow key to move the cursor to the desired selection.
6) At “User List”, press the Enter key to return to the original User List screen selected by the user.

5. Scope Buttons Key (70K/72K/80K/81K/85K Series Endoscopes)

Function: Assign function to scope control buttons

1) Press this key to get the menu.
2) Press Up/Down arrow key to move the cursor to the desired button
3) Press Right/Left arrow key to assign function to the each selected button
   • Right arrow key: 0 → 1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 → 0
   • Left arrow key: 8 → 7 → 6 → 5 → 4 → 3 → 2 → 1 → 0 → 7 → 8
4) Select ESC and press Enter key (or ESC key) to get back to the normal screen.

6. Scope SW

CAUTION - *NEVER assign a PC or printer using the Scope Switch menu while a computer or a printer has been disconnected from the processor.*

1) Press this key to get the menu.
2) Press Up/Down arrow key to move the cursor to the desired selection
3) Press Right/Left arrow key to assign function to the each selection
   - Film Counter: None → Out1 → Out2 → Printer* → None
   - Copy Function: None → Out1 → Out2 → Out1,2 → PC → PC & Out1 → PC & Out2 → PC & Out1,2 → Printer* → Printer & Out1* → Printer & Out2* → Printer & Out1, 2* → Printer & PC* → Printer & Out1 & PC* → Printer & Out2 & PC* → Printer & Out1,2 & PC* → None
   - VTR Function: None → Out1 → Out2 → Out1,2 → PC → PC & Out1 → PC & Out2 → PC & Out1,2 → Printer* → Printer & Out1* → Printer & Out2* → Printer & Out1, 2* → Printer & PC* → Printer & Out1 & PC* → Printer & Out2 & PC* → Printer & Out1,2 & PC* → None

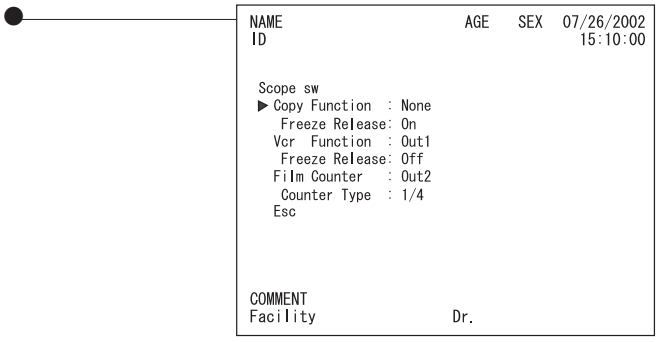
NOTE

**Appears only when PC key selects Sony Video Printer UP-50.*

- Freeze Release: On → Off → On
- Counter Type: 1 to 99 (1, 2... 98, 99, 1...)
  → 1/2 (1/2, 2/2, 1/2, 2/2...)
  → 1/4 (1/4, 2/4, 3/4, 4/4, 1/4...)
  → 1/8 (1/8, 2/8... 7/8, 8/8, 1/8...)
  → 1/16 (1/16, 2/16... 15/16, 16/16, 1/16...)
  → Off
  → 1 to 99 (1, 2... 98, 99, 1...)

NOTE - *"Printer followed" is displayed when PC key selects Sony Video Printer UP-50 and when film counter selects "printer".*

4) Select ESC and press Enter key (or ESC key) to get back to the normal screen.

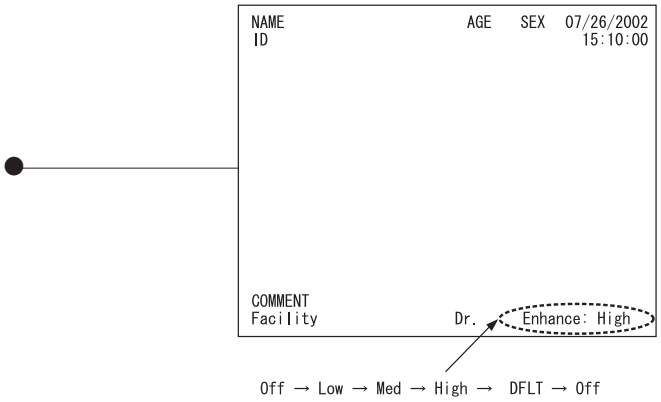


7. Enhance Level

1) Press this key to display the message for about 3 seconds.
2) During the display, press the key to move to Off → Low → Med → High → DFLT → Off.

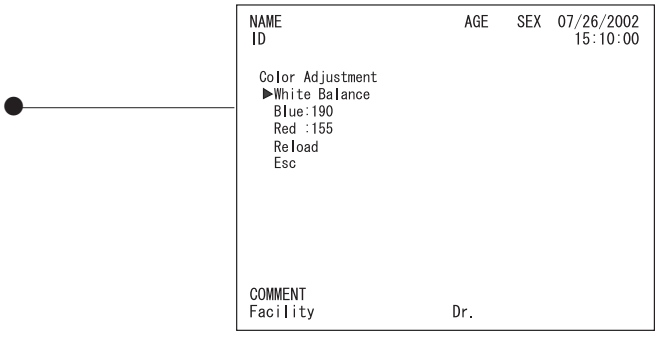
NOTE -*DFLT is displayed when special level is previously assigned to the scope. When the scope is disconnected from the processor with setting of DFLT , the DFLT remains on the memory. When the scope is disconnected with setting other than DFLT , the DFLT will not remain on the memory.*

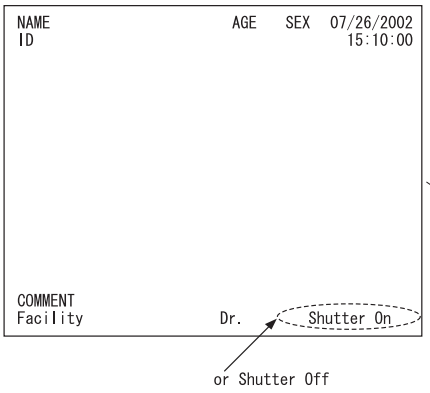
CAUTION - *This menu can only be displayed if an endoscope is connected to the processor.*

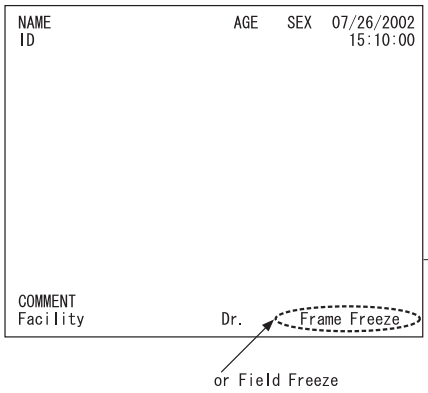


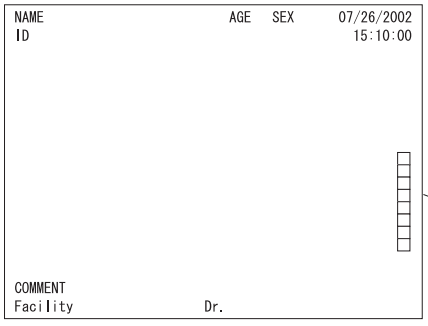
8. Color Adjustment

1) Put the distal end of the endoscope into the white balance adjuster supplied with the video processor.
2) Watching the monitor, adjust the position of the distal end of the scope in the adjuster so that the grains inside the adjuster can be recognized on the full screen. If any halation is recognized on the screen, lower the brightness level so that the grains inside the adjuster can be recognized clearly.









3) Press this key to get the menu.
4) Press Up/Down arrow key to move the cursor to “White Balance”.
5) Press Enter key and remove the distal end from the adjuster. After adjustment, “WB OK!”, is displayed for about 3 seconds.
6) If fine-tuning is necessary, press Up/Down key to the desired selection, blue or red.
7) At blue or red, press Right/Left arrow key to change the value.
8) Select ESC and press Enter key (or ESC key) to exit the menu.

CAUTION - This menu can only be displayed if an endoscope is connected to the processor.

9. Shutter Mode

NOTE - When activated (“Shutter On”), the shutter speed is automatically increased during close viewing to obtain very sharp “frozen” images. This function applies only to 70K/72K/80K/81K/85K-series endoscopes.

1) Press this key to display the message for about 3 seconds.
2) During the display, press the key to toggle between Shutter On and Shutter OFF.

CAUTION - This menu can only be displayed if an endoscope is connected to the processor.

10. Freeze Mode

NOTE

- *Field Freeze: for a more stabilized frozen image.*
- *Frame Freeze: for a higher resolution.*

1) Press this key to display for about 3 seconds.
2) During the display, press the key to toggle between Field and Frame.

11. Clear Screen

1) Press this key to show the data once deleted with setting of User key.
2) Press the clear screen key again to remove the data

12. Color Bar

1) Press this key to get the color bar on the screen.
2) Press this key to remove the color bar from the screen.

13. Character Off

1) Press this key to remove all screen information. When an endoscope is not connected, “Scope not connected” is displayed.
2) Press this key again to get the information back on the screen.

14. Date

1) Press this key to get the menu.
2) Press Up/Down arrow key to move the cursor to the desired selection.
3) Press Enter key to make selection and to get the cursor under the first field.
4) Input numeric data in each field.
5) Press Right arrow key to advance through a field without changing the information.
6) Press Enter key or ESC key to exit the menu.

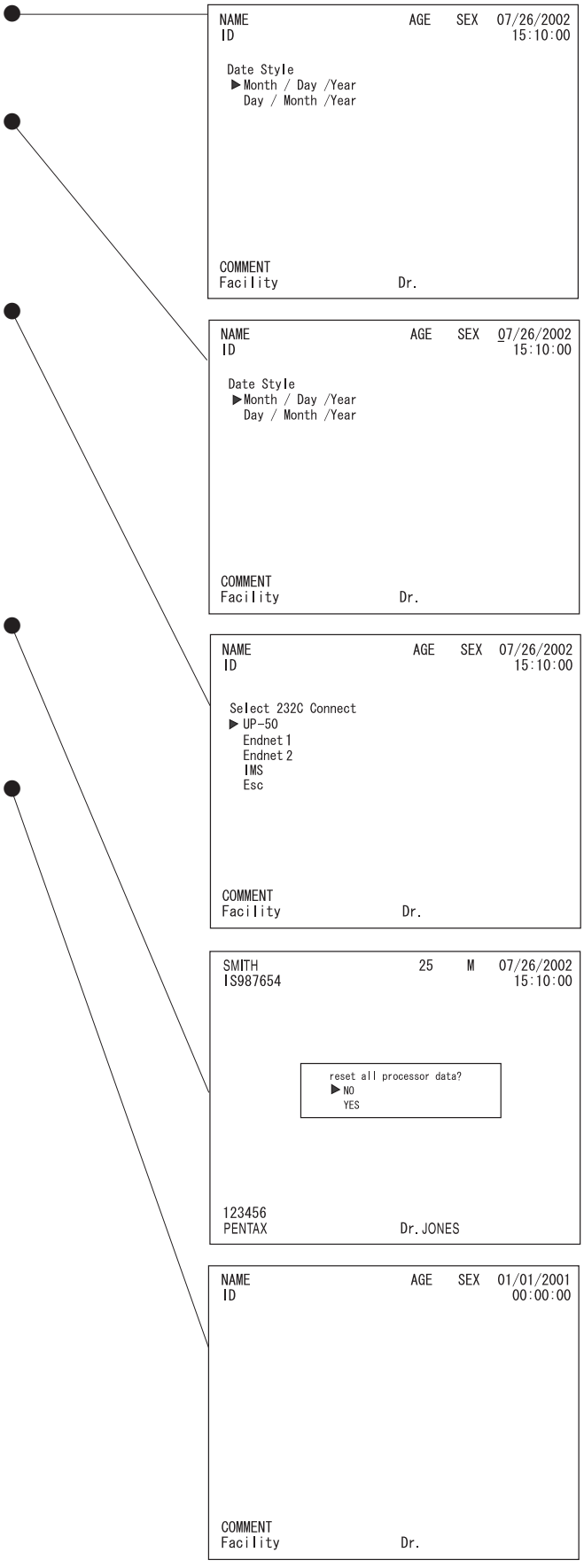
15. PC

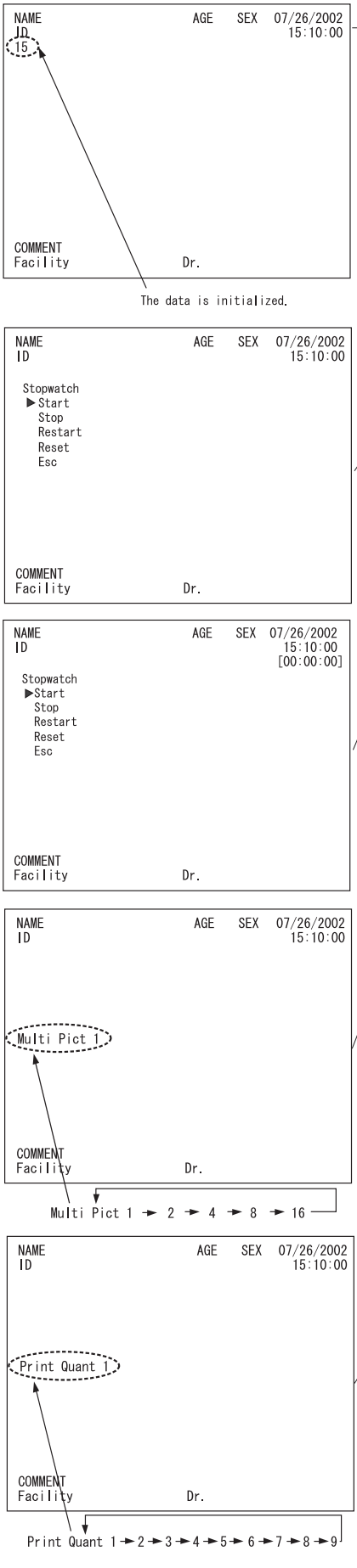
1) Press this key to get the menu.
2) Press Up/Down arrow key to move the cursor to the desired selection.
3) Press Enter key to make selection. The selected one turns green.
4) Select ESC and press Enter key (or ESC key) to remove the menu.

NOTE - *The selection depends upon country and/or local PENTAX distributor.*

16. Init

1) Press this key to be asked for confirmation if "Reset all processor data? No/Yes"
2) Press Up/Down arrow key to move the cursor to the desired selection.
3) Press Enter key to make selection
   • If Yes: all data is reset.
   • If No: the question is removed without resetting any data.





17. Clear Counter

NOTE - *This key is not valid when scope SW selects "NONE" for film counter.*

1) Press this key to initialize the value already set with scope SW.

18. Stopwatch

1) Press this key to get the menu
2) Press Up/Down arrow key to move the cursor to the desired selection.
3) Press Enter key to make selection
   - Start: displays and runs the stopwatch
   - Stop: stops the stopwatch and displays the last value
   - Restart: restarts the stopwatch from the last value
   - Reset: stops the stopwatch and resets the display to (00:00:00)
   - ESC: exit the menu. When it is on "Reset", the stopwatch will be removed from the normal screen. In the other cases, the stopwatch will remain on the normal

19. Multi Picture

NOTE - *This function is valid on condition that;*

- *Copy function is activated with scope switch*
- *PC key selects Sony Video Printer UP-50*
- *Sony Video Printer UP-50 is connected to RS-232C output terminal*

1) Press this key to display number of split screens already set for about 3 seconds
2) Press this key repeatedly to change it to 1 → 2 → 4 → 8 → 16 → 1.

NOTE - *Press this key to start printing provided the video printer already contains previously stored images (and provided that before printing, the cursor is not positioned on the first image). After printing, multi-picture images change according to the pre-selected setting.*

CAUTION - *While menus for other functions are displayed on the screen, this function key will not work. Return to the live screen and then press the key to activate this function.*

20. Print Quant

NOTE - *This function is valid only on condition that;*

- *Copy function is activated with scope switch*
- *PC key selects Sony Video Printer UP-50*
- *Sony Video Printer UP-50 is connected to RS-232C output terminal*

1) Press this key to display for three seconds the quantity of prints required
2) Press the key repeatedly to change it to 1 → 2 → 3 ... 9 → 1

CAUTION - *While menus for other functions are displayed on the screen, this function key will not work. Return to the live screen and then press the key to activate this function.*

21. Delete Image

NOTE - *This function is valid only on condition that;*

- *Copy function is activated with scope switch*
- *PC key selects Sony Video Printer UP-50*
- *Sony Video Printer UP-50 is connected to RS-232C output terminal*

1) Press this key to display " Delete Image?" for about 3 seconds.
2) During the display, press this key to delete the images currently stored.
3) If the monitor is connected to a video printer, "Delete Image? " is not displayed. Instead, this cursor moves from a split screen to another as shown below to delete each image.

CAUTION - *While menus for other functions are displayed on the screen, this function key will not work. Return to the live screen and then press the key to activate this function.*

22. Print

NOTE - *This function is valid only on condition that;*

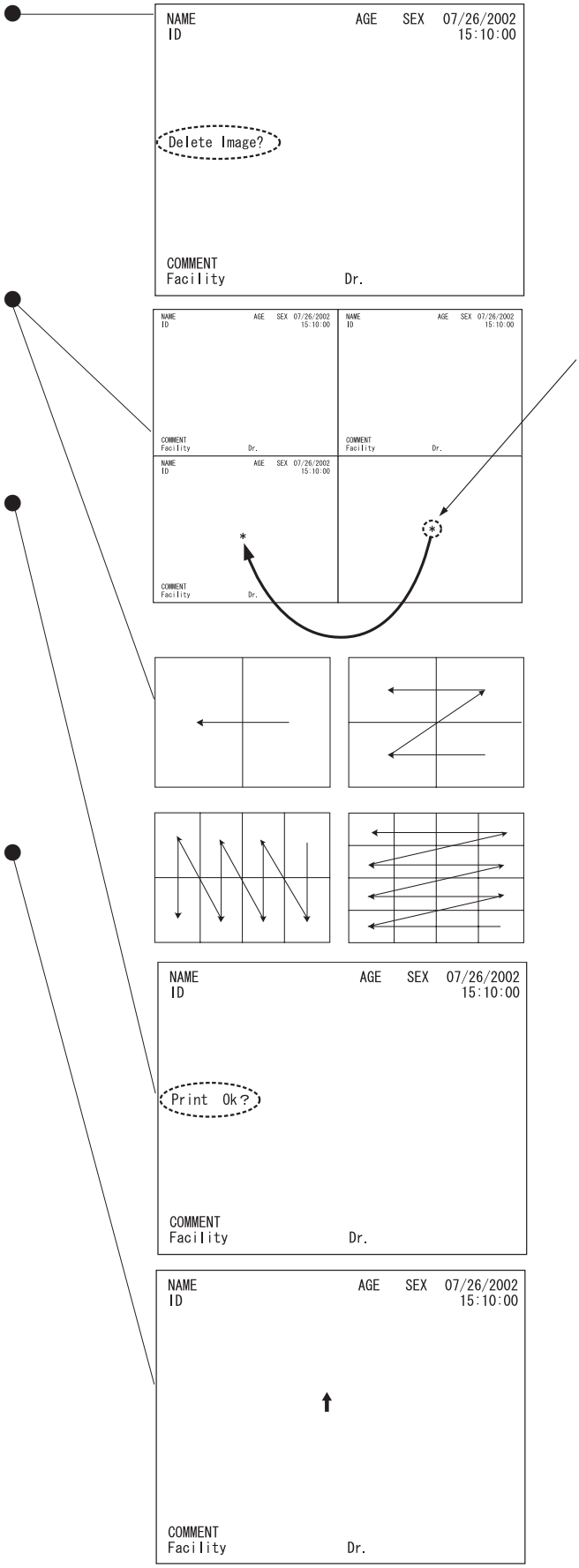
- *Copy function is activated with scope switch*
- *PC key selects Sony Video Printer UP-50*
- *Sony Video Printer UP-50 is connected to RS-232C output terminal*

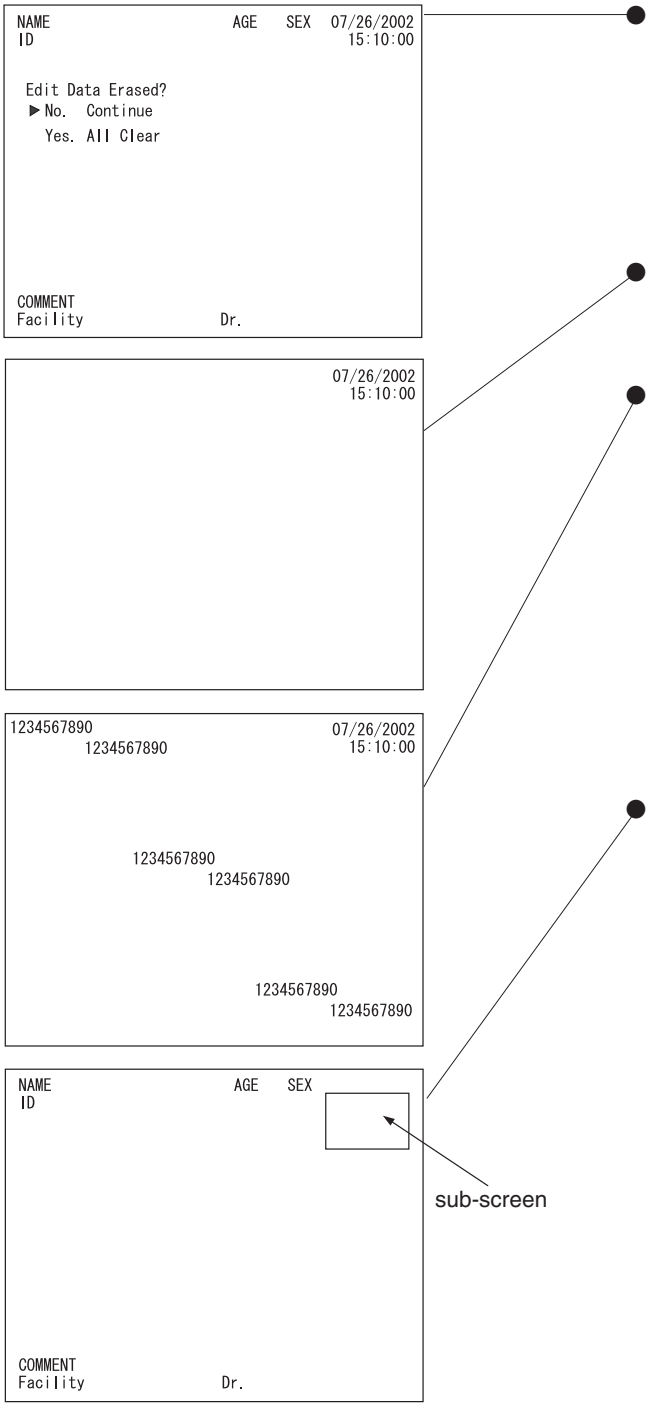
1) Press this key to display "Print OK?" for about 3 seconds
2) During the display, press the key to start printing

CAUTION - *While menus for other functions are displayed on the screen, this function key will not work. Return to the live screen and then press the key to activate this function.*

23. Pointer

1) Press this key to call the pointer.
2) Press Up/Down/Right/Left arrow key to change the position.
3) Press ESC key or the pointer key again to remove the pointer





24. Editor

NOTE - *Date and clock remain unchanged.*

1) Press this key to be asked for confirmation.
2) Press Up/Down arrow key to move cursor to desired selection.
3) Press Enter key to make selection
   - If "No" is selected, data, clock and previous editor data are displayed.
   - If "Yes" is selected, data and clock are displayed (previous editor data is deleted.)
4) Press Up/Down/Right/Left arrow key to move cursor to desired position.
5) Press alpha-numeric key to input (except date and clock)
6) Press ESC key, Editor key or other function keys to exit the menu.

25. VTR

NOTE - *This function is valid only on condition that;*

- *VTR function is activated with scope switch*
- *PC key selects Sony Video Printer UP-50*
- *Sony Video Printer UP-50 is connected to RS-232C output terminal*

1) Press the key to activate output peripheral such as VTR according to the setting with the scope switch key.

26. Freeze

1) Press this key to get a still endoscopic image frozen on the main screen and the endoscipic live image on the sub-screen activate freeze function.
2) Press the key again to release the main screen from the still image and remove the sub-screen.

27. Copy

NOTE - *This function is valid only on condition that;*

- *Copy function is activated with scope switch*
- *PC key selects Sony Video Printer UP-50*
- *Sony Video Printer UP-50 is connected to RS-232C output terminal .*

1) Press this key to activate output peripheral such as copy according to the setting with the scope switch key.

28. Capture

NOTE - *The PC Capture function will work ONLY when; The special software, Endoimage OS-I1, is installed onto the PC connected to the processor.*

1) Press this key to transmit a "frozen" endoscopic image to the PC.
   Alternatively, instead of using this button on the keyboard, the same PC Capture function can be activated via one of the remote control buttons that have previously been assigned for this specific function (70K/80K Series Endoscopes only)

29. Scope Model

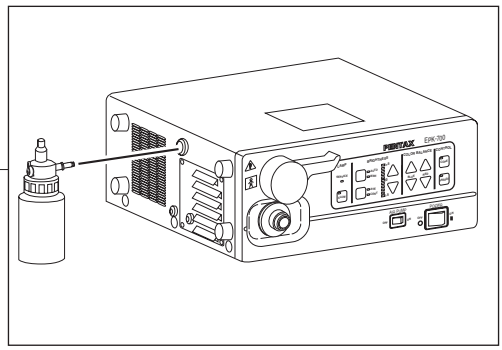
The model name and serial no. of the scope are displayed for about 1 minute when pressing any character key during the normal screen display. Press any character key again to remove the data.

5. MAINTENANCE

5-1 AFTER EACH PROCEDURE

1. Turn OFF the power switch.

NOTE - *Some peripheral devices may have to be turned OFF BEFORE the EPK-1000 to avoid compromising their operation. Refer to the operating instructions supplied with all the components of the video endoscopy system to establish the right order in which each component should be turned OFF in due course.*



2. Disconnect the power plug, endoscope and water bottle .

NOTE - *Always turn OFF the processor BEFORE disconnecting the endoscope.*

3. Wipe all surfaces with gauze slightly dampened with alcohol.

NOTE - *NEVER allow liquids to be splashed on the EPK-1000. Be sure connector interfaces and ventilation ports are not allowed to become wet. To avoid processor damage, do NOT allow harsh chemicals or cleaning agents to contact the front panel membrane. Wipe with alcohol only.*

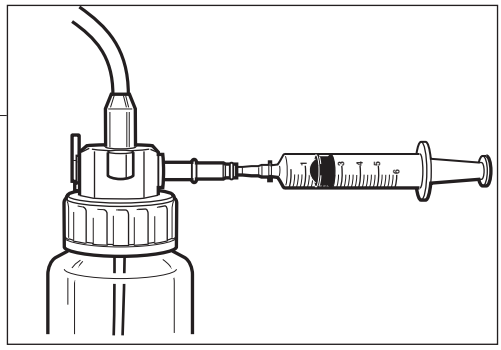
5-2 WATER BOTTLE CLEANING

NOTE - *Be careful when handling the water bottle. Do NOT carry the water bottle by the Air/Water connector or Air/Water hose. When the cap assembly has been separated from the bottle, be careful in handling the water feeding stem.*

Water bottles should be sterilized at least on a daily basis. Like all endoscopic accessories, the water bottle assembly must be thoroughly cleaned. Failure to do so could result in incomplete or ineffective sterilization.

(1) CLEANING

1. Immediately after use, the entire water bottle assembly (bottle, cap assembly and tubing) should be washed with fresh detergent solution and dampened gauze or scrub brush. Complete immersion in an enzymatic detergent solution should be used for soiled items.
   Internal surfaces of the water bottle assembly may be exposed to the detergent by injecting the detergent into the air pipe stem (opposite the A/W-Drain lever on the water bottle cap) using a syringe. The A/W-Drain lever should be set to the A/W position to ensure contact with all internal tubes.
2. Ultrasonic cleaning of the entire water bottle assembly is recommended to access difficult to reach areas. Use an operating frequency of 44 kHz ± 6% for a period at least 5 minutes.
3. After washing with the cleaning solution, all surface areas of the water bottle assembly should be thoroughly rinsed and dried. Use gauze or lint-free cloth to wipe dry most surfaces. Compressed air and 70% alcohol may be used to facilitate drying of hard to reach areas.



(2) STERILIZATION

Before any attempt has been made to sterilize the water bottle assembly, ensure that the cleaning process above has been completed.

NOTE - The sterilization parameters are only valid with sterilization equipment that is properly maintained and calibrated. Use appropriate heat process indicators and/or biological monitors as recommended by the manufacturer of the sterilizer.

(2-1) STEAM STERILIZATION

1. The OS-H4 water bottle assembly has been designed to withstand high pressure steam sterilization procedures. Use the parameters below;

Sterilizer Type	:	Prevacuum
Temperature	:	132 ~ 135°C (270 ~ 275°F)
Time	:	5 minutes

2. During steam sterilization, ensure that the cap and tubing section have been removed from the water bottle container. Make sure that the drain lever on the water bottle cap is set at A/W position (upright).

CAUTION - Use only the type of packaging material and package configuration as recommended by the manufacturer of the sterilizer. Use appropriate heat process indicators and/or biological monitors as recommended by the manufacturer of the sterilizer.

(2-2) ETO STERILIZATION

1. Ethylene Oxide (ETO) gas sterilization can be performed on PENTAX water bottles, provided they have first been properly cleaned and thoroughly dried.

⚠WARNING - Failure to thoroughly dry all surface areas could result in Incomplete or Ineffective sterilization. Moisture could prevent contact of the ETO gas with the actual contaminated surfaces.

2. The following parameters for Ethylene Oxide Gas Sterilization are proposed.

Temperature:	55˚C (131˚F)
Relative Humidity:	50%RH
EO Concentration :	600-650mg/L
Gas Exposure Time:	5 Hours
Aeration:	12 Hours at 55˚C (131˚F)

3. During ETO sterilization, ensure that the cap and tubing section have been removed from the water bottle container. Make sure that the drain lever on the water bottle cap is set at A/W position (upright).

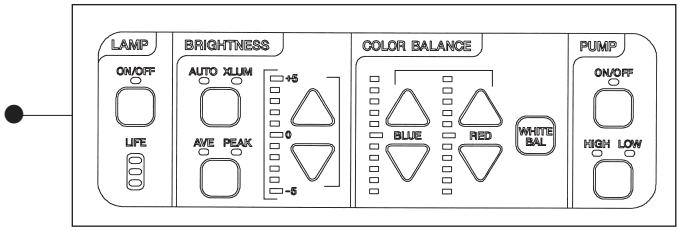
5-3 STORAGE

Do NOT store the unit in direct sunlight or where temperature and humidity are high or where it can be exposed to liquids.

For long term storage, take precautions to reduce dust build up within the EPK-1000. Accumulation of dust within these units may cause malfunction, smoke, or ignition.

5-4 CHANGING THE LAMP

Check the lamp life indicator on the front panel. If red, the old lamp should be replaced with a new lamp before beginning another procedure.



Lamp Replacement

WARNING - When lamps require replacement in the EPK-1000, PENTAX strongly recommends the replacement of both lamp and cartridge as a set. These PENTAX replacement lamp/cartridge assemblies have been developed for optimal illumination and safety. Only replacement lamp modules, namely PENTAX model OL-X22 for 120V EPK-1000 and OL-X20 for 100V/230V EPK-1000 units should be used.

The use of unauthorized lamps can create a potential for excessive light intensity and/or heat whose impact to patient safety has not been established.

CAUTION - During the following procedures, always wear rubber gloves to prevent application of skin oils to the glass. Do NOT touch the glass surfaces of the new lamp directly with one's fingers.

A. How to remove the lamp unit.

1. Turn OFF the processor by depressing the power switch and disconnect the plug from the electrical outlet.
2. Using a Phillips screw driver, open the lamp housing cover to expose the lamp unit.

CAUTION - Immediately after use, the metal lamp cover and the lamp bulb may be HOT. To avoid burns, do NOT touch these areas immediately after use.

CAUTION - Be careful not to lose the four screws removed from the lamp housing cover.

3. Squeeze both sides of the lamp connector with one's thumb and forefinger and pull out the connector from the lamp socket (Fig.2-1).
4. Turn the lamp fixture knob counter clockwise to loosen it (Fig.2-2).

NOTE - The Lamp fixture knob is wired not to fall out from the lamp base. NEVER pull it out forcibly.

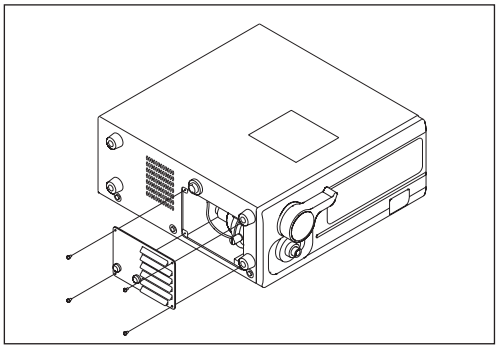


Fig.1

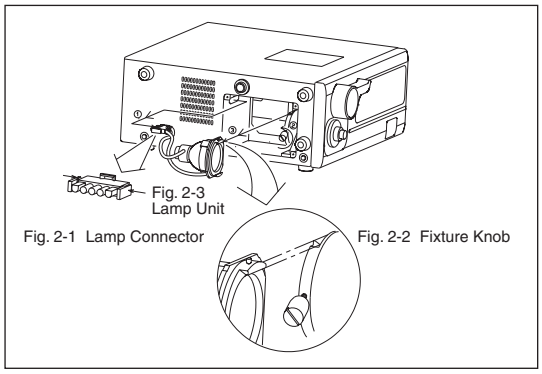


Fig. 2 How to remove the lamp unit

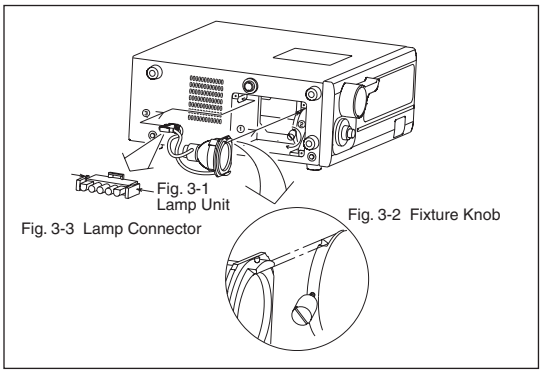


Fig. 3 How to attach a lamp unit

5. Carefully pull out the lamp unit from the lamp base and do NOT to hit the lamp unit against the fixture knob (Fig.2-3).
6. Follow local regulations for discarding the old lamp. If unsure of appropriate procedures for lamp disposal, return the lamp unit to PENTAX after packing it appropriately to avoid any damage during shipping.

B. How to attach a lamp unit

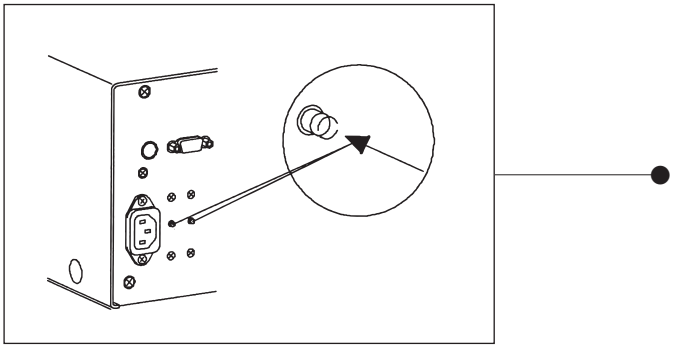
1. Hold the lamp unit with the nut on the edge of the lamp in an upward position and carefully align the hook of the lamp unit with the groove of the lamp base and push the lamp unit into lamp base (Fig.3-1).
2. Turn the fixture knob clockwise to secure firmly (Fig.3-2).
3. Squeeze both sides of the lamp connector with the V mark upward as shown in Fig.3 and gently insert the connector into the socket (Fig.3-3).
4. Attach the lamp housing cover and ensure that the cover does not make contact with or close upon the cable (Fig.1).

CAUTION - Contact of the cable with the lamp housing cover may result in malfunction of ignition.

C. Reset the lamp life indicator.

After replacing the new lamp unit, reset the lamp life indicator on the front panel of the processor.

1. Plug the power code into the electrical outlet and turn ON the power.
2. Hold “Ctrl”, “Alt” key and press “Stopwatch” key to display “Life Meter Set” menu on monitor screen.
3. Press Up/Down arrow key to move the cursor to “Lamp Reset” and then press “Enter” key. Press “ESC” key to exit from “Life Meter Set” menu.
4. Turn OFF the power switch and press ON/OFF switch again. Confirm that the LED on the lamp life indicator lights in green color.



5-5 RESETTING THE BREAKERS

1. If the video processor is not operational after turning ON the power, turn the power switch OFF.

2. Check the breaker buttons on the rear panel. If these buttons are sticked out, press both buttons down until they “click” into the depressed positions.

3. If operation stops during procedure, first turn the processor OFF. Wait 10 seconds or more and then press both breaker buttons down until they click into the depressed positions.

4. After resetting the breakers, if the breakers still activate when the EPK-1000 is turned ON, turn the power OFF immediately and disconnect the power cord. Contact PENTAX service center.

6. TROUBLE-SHOOTING GUIDE

CONDITION	CHECK	ACTION
Power does not come ON	Power cord	Ensure proper connection at unit and wall outlet.
	Breaker	Ensure that the red button is not protruding out.
	Power outlet	Move the power cord to a power socket that is known to work.
No display on monitor	Monitor/ other peripheral devices	Ensure that power is ON for all devices.
		Ensure that proper video input is selected for all devices.
	Cable connections	Ensure that all video cables are connected properly.
Text cannot be typed to screen	Keyboard	Ensure that keyboard is properly connected to the processor.
Lamp will not ignite	Lamp life indicator	If the indicator lights red, a new lamp should be installed before beginning the next procedure.
No image on main screen	Endoscope	Ensure that the endoscope is connected properly.
	Lamp	Ensure that lamp is ignited.
Image on screen is black and white	Lamp	Ensure that lamp is ignited.
Unusual characters on screen and no response to any key on the keyboard		Turn OFF the processor and contact your PENTAX service center.
Endoscope control buttons do not control functions	Scope	Ensure that endoscope is properly connected.
	Freeze, Copy, VCR, keyboard, control buttons	Test keyboard control buttons. If they activate features and endoscope control buttons do not, call a service representative.
	Cables	Ensure that all control cables are properly connected.
No air delivery at distal end of endoscope	Air pump	Ensure that air pump is ON.
	Water bottle	Ensure proper connections at EPK-1000 and endoscope.
		Ensure that the A/W-Drain lever is in the A/W position.
	A/W valve	Ensure that the A/W valve aperture is not clogged, inspect all O-rings, clean the A/W valve.
	Endoscope	Check endoscope to confirm that the air channel/nozzle is not clogged/blocked.
No water delivery at distal end of endoscope	Air pump	Ensure that air pump is ON.
	Water bottle	Ensure proper connections at EPK-1000 and endoscope.
		Ensure that water bottle is 2/3 full.
		Ensure that the A/W-Drain lever is in the A/W position.
		Ensure that the water feeding stem is connected to the cap Assembly inside the bottle.
	A/W valve	Ensure that the A/W valve aperture is not clogged, inspect all O-rings, clean the A/W valve.
	Endoscope	Check endoscope to confirm that the air channel/nozzle is not clogged/blocked.
“PRINTER NOT CONNECT” is displayed on monitor	Peripheral devices (up-50)	Ensure that Sony Video Printer, up-50 is connected properly to RS-232C output terminal and turned on.

CONDITION	CHECK	ACTION
"PC Warning" is displayed on monitor	Check the amount of free storage space on the hard disk drive and the setup value of "Alert Disk Size" on the setting panel of Endoimage, OS-I1.	To obtain sufficient disk storage space exceeding the value of "Alert Disk Size", delete the exceeded files or add more hard disk capacity.
"PC Alert" is displayed on monitor *(The amount of free space is less or equal to 1 MByte.)*	Check the amount of free storage space on the hard disk drive and the setup value of "Alert Disk Size" on the setting panel of Endoimage, OS-I1.	To obtain sufficient disk storage space exceeding the value of "Alert Disk Size", delete the exceeded files or add more hard disk.
"SCP COM ERR" is displayed on monitor	Ensure that the endoscope is connected properly.	First, turn OFF the processor and other peripheral devices per instructions supplied with the products. Then remove the endoscope from the interface socket. Next, reconnect the endoscope to the interface socket. Turn ON all devices per the instructions.
"PC CAP ERR" is displayed on monitor *(Internal communication fault)*		Turn OFF the processor and then ON again, or re-enter the patient name or ID.
Long beep signal. Copy and VTR function do not activate.	• Scope Switch menu • Computer/Peripheral devices	• Change the selected settings of Copy and VTR by Scope Switch menu. Do NOT select the device switched OFF or disconnected. • Ensure that the peripheral devices are properly connected to computer. • If Capture function is activated, ensure that Endoimage OS-I1 functions properly.
PRINTER NOT CONNECTED is displayed on monitor.	• Printer	• Ensure that power switch of the printer is ON. • Confirm that the cable between the processor and the printer is securely connected. • Check the settings of the printer according to the manual supplied with printer.
PC NOT FOUND is displayed on monitor.	• Ensure that the PC is connected prorerly to the processor. • Ensure that power switch of the PC is ON. • Ensure that Endoimage is activated.	• First, turn OFF the processor and other peripheral devices per instructions supplied with the products. Then connect the PC to the processor. Next, turn ON all devices per the instructions. • Turn the power switch ON. • Confirm that the main screen of Endoimage is appeared on the monitor. If not, install the provided installation CD of Endoimage into your PC as per the manual supplied with the processor.
"LFM COM ERR" is displayed on the monitor screen.	Check the lamp life indicator.	If the LED within the indicator does not light, turn the power OFF the video processor and contact your local PENTAX service facility.

* If the condition remains, contact your PENTAX service facility.

7. SPECIFICATIONS

Item	Specification	FOR USA & CANADA	EUROPE & OCEANIA
Power Requirements	Voltage	120 VAC (NTSC MODEL)	230VAC (PAL MODEL)
	Frequency	50 – 60 Hz	
	Power consumption	2.0A	1.0A
	Voltage fluctuation	+/– 10 %	
Operating Environment	Temperature Relative humidity Air pressure	10 ~ 40°C 30 ~ 85 % 700-1060 hPa	
Storage/transport Environment	Temperature Relative humidity Air pressure	–20 ~ 60°C 0 ~ 85 % 700 ~ 1060 hPa	
Illumination	Lamp	Xenon Lamp XBO R 100w/10A	
	Lamps average life span	400 hours (the processor with serial no. UBxxxx/EBxxxx)	
	Color temperature	≤ 6,500 K	
	Lighting format	Switching regulator with continuous illumination	
	Brightness control	Selection - Automatic or Manual	
	Automatic iris	Servo type	
Scope Compatibility	PENTAX color video endoscopes	NTSC MODEL	PAL MODEL
	PENTAX fiberscopes	With use of appropriate fiberscope video adapter module	
		NTSC MODEL	PAL MODEL
	Other manufacturers' fiberscopes	With use of appropriate fiberscope video adapter module and appropriate eyepiece/light guide adapters	
Air Feed System	Air pump system	DC Diaphragm	
	Pressure setting at flow rate of 0	50 ~ 70 kPa (7.3~10.2 PSI)	40 ~ 62 kPa (5.8~9.0 PSI)
	Standard air feed volume at inlet of water bottle	Low: 1.8 ~ 3.2 L/min High: 3.3 ~ 5.0 L/min	Low: 3.8 ~ 5.9 L/min High: 6.0 ~ 9.5 L/min
Water Feed System	Water bottle assembly pressurized by pump	Bottle capacity = 250mL	
Brightness Control System	Automatic	Selection - Average or Peak	
	Manual	+/– 5 step adjustment	
Color System	Color correction	Red +/– 5 steps Blue +/– 5 steps	
Freeze Function	Live video image provided when freeze mode activated		
Cooling	Forced air cooling		
Video Outputs	2 sets: RGBS (NTSC or PAL), 9pin D-Sub female connectors 1 set : Composite (NTSC or PAL), BNC connector 2 sets: Separate Video (Y/C), 4-pin female connector 1 set : Computer, 9-pin D-Sub female connector		
Classification as Electro Medical Equipment	Type of protection against electric shock	Class I equipment, 3 prong plug	
	Degree of protection against electric shock	BF Type (Body Floating), using insulated endoscope. Use on heart is prohibited	
	Degree of explosion proofing	Do not use in potentially flammable surroundings	
Electro Magnetic Compatibility		EN 60601-1-2 (2002) for EU IEC 60601-1-2 (2001) for other countries	
Compliance	Designed in accordance with	UL 2601-1	IEC 60601-1
Size	Dimensions	Width = 380 mm Height = 155 mm Depth = 420 mm	
Weight		Main Body = 15.0 kg	

8. ELECTROMAGNETIC COMPATIBILITY

Guidance and manufacturer's declaration-electromagnetic emissions

The EPK-1000 is intended for use in the electromagnetic environment specified below. The customer or the user of the EPK-1000 should assure that it is used in such an environment.

Emissions test	Compliance	Electromagnetic environment-guidance
RF emissions CISPR 11	Group 1	The EPK-1000 uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The EPK-1000 is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	

Guidance and manufacturer's declaration-electromagnetic immunity

The EPK-1000 is intended for use in the electromagnetic environment specified below. The customer or the user of the EPK-1000 should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment-guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±(2, 4, 6) kV contact ±(2, 4, 8) kV air	±(2, 4, 6) kV contact ±(2, 4, 8) kV air	Floors should be wood, concrete or ceramic tile, if floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fest transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for signal lines	±2 kV for power supply lines ±1 kV for signal lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV differential mode ±2 kV common mode	±1 kV differential mode ±2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5 % *U*T (>95 % dip in *U*T) for 0.5 cycle 40 % *U*T (60 % dip in *U*T) for 5 cycles 70 % *U*T (30 % dip in *U*T) for 25 cycles <5 % *U*T (>95 % dip in *U*T) for 5 sec	<5 % *U*T (>95 % dip in *U*T) for 0.5 cycle 40 % *U*T (60 % dip in *U*T) for 5 cycles 70 % *U*T (30 % dip in *U*T) for 25 cycles <5 % *U*T (>95 % dip in *U*T) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment, if the user of the EPK-1000 requires continued operation during power mains interruptions, it is recommended that the EPK-1000 be powered from an uninterruptible power supply.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3A/m	3A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

NOTE: *U*T is the a.c. mains voltage prior to application of the test level.

Guidance and manufacturer's declaration-electromagnetic immunity

The EPK-1000 is intended for use in the electromagnetic environment specified below. The customer or the user of the EPK-1000 should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment-guidance
			Portable and mobile RF communications equipment should be used no closet to any part of the EPK-1000, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance**
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	$d = 1.2\sqrt{P}$ $d = 1.2\sqrt{P}$ 80 MHz to 800 MHz $d = 2.3\sqrt{P}$ 800 MHz to 2.5 GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m).
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3V/m	Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range Interferance may occur in the vicinity of equipment marked with the following symbol:

NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the EPK-1000 is used exceeds the applicable RF complience level above, the EPK-1000 should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary such as reorlenting or relocating the EPK-1000.

[b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Recommended separation distances between portable and mobile RF communications equipment and the EPK-1000

The EPK-1000 is intended for use in the electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the EPK-1000 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the EPK-1000 as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz $d = 1.2\sqrt{P}$	80 MHz to 800 MHz $d = 1.2\sqrt{P}$	800 MHz to 2.5 GHz $d = 2.3\sqrt{P}$
0.01	0.12 m	0.12 m	0.23 m
0.1	0.38 m	0.38 m	0.73 m
1	1.2 m	1.2 m	2.3 m
10	3.8 m	3.8 m	7.3 m
100	12 m	12 m	23 m

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 These quidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

MEMO

NOTICE

This equipment is a Class B Medical Equipment (specified EN55011) and is intended for hospital or health care districts.

When used in clinical or residential areas near radio and TV receiver units, this equipment may be subjected to radio interference.

To reduce electromagnetic interference do NOT keep turning on the main POWER SWITCH of the equipment while a videoscope is connected but not ready for use.

To avoid and resolve adverse electromagnetic effects, do NOT operate this equipment near the RF energy equipment.

Only connection cables and keybord specifled by PENTAX conform to the above standards.

HOYA Corporation
2-7-5 Naka-Ochiai, Shinjuku-ku, Tokyo 161-8525 Japan

HOYA Corporation PENTAX Tokyo Office
2-36-9 Maeno-cho, Itabashi-ku, Tokyo 174-8639 Japan
Tel: 03-3960-5155
Fax: 03-5392-6724

PENTAX Medical Singapore Pte. Ltd.
60 Alexandra Terrace, #10-08 The Comtech, Singapore 118502
Tel: 65-6271-1669
Fax: 65-6271-1691

PENTAX Medical Company
A Division of PENTAX of America, inc.
102 Chestnut Ridge Road Montvale, New Jersey 07645-1856
Tel: 201-571-2300 Toll Free: (800) 431-5880
Fax: 201-391-4189

PENTAX Canada Inc.
1770 Argentia Road Mississauga, Ontario L5N 3S7
Tel: 905-286-5585
Fax: 905-286-5571

PENTAX Europe GmbH
Julius Vosseler Strasse 104, 22527 Hamburg, Germany
Tel: 040-56-1920
Fax: 040-560-4213

PENTAX U.K. Ltd.
PENTAX House, Heron Drive, Langley SLOUGH SL3 8PN, Great Britain
Tel: 1753-792792
Fax: 1753-792794

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● Specifications are subject to change without notice and without any obligation on the part of the manufacturer.

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